Ref. Ares(2018)543184 - 30/01/2018

Progress report -

Deliverable D7.7 – D31

Enigma ITN

January 2018

Progress report – Enigma ITN

Deliverable D7.7 – D31

Project Officer, European Commission: Luisa Marconi
Coordinator of Enigma ITN: CNRS, France

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

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This deliverable "Progress Report "was created by using the template for the Progress Report provided on the European Home Participant Portal of the Enigma ITN.

1. General Progress Of The Action

Please provide information on scientific progress and training courses that occurred during the period covered by this report (including deliverables and milestones as described in the Grant Agreement).
Describe and justify any deviation from the original Work Plan in this section.

1.1. Milestones

The three Milestones described in the Grant Agreement required before January 2018 have all been reached

i. Website completion

The delivery date was February 2017. This milestone was reached on time.

ii. Recruitment completion

The delivery date was January 2018. This milestone was reached in December 2017; as agreed in December 2017 with the Project Officer Luisa Marconi, the report for the corresponding deliverable was submitted on the Participant Portal in January 2018.

iii. Development Plans

The delivery date was January 2018. This milestone was reached on time. ULG (University of Liège) collected all the PCDP on a common file shared with the EPM (European Project Manager).

1.2. Scientific progress

ESRs started their projects from May 2017 to December 2017. The first assessment of scientific progress was done during meeting n°2 in Liège in October 2017. Annex 1 gathers the overview presentations summarizing the advancement of each ESR project. During these presentations, ESRs also gave an overview of their previous training.

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1.3. Training courses

The two training courses described in the Grant Agreement, expected to occur during the period covered by this report (January 2017 – January 2018) were held in Liège, Belgium and Ploemeur, France in October 2017.

i. Workshop 1 - *Advanced subsurface characterization methods: theory and field practice* held in Liège (Belgium) in October 2017.
The corresponding deliverable report D6.3 – D16 is on the Participant Portal and has been approved.

ii. Workshop 2 - *Multi-scale investigation of fractured media* held in Ploemeur (France) in October 2017.
The corresponding deliverable report D6.4 – D17 is on the Participant Portal and has been approved.

The workshop 1 was expected to be held before July 2017 and the workshop 2 was expected to be held before September 2017.
However, it was decided during the Kick-Off meeting in Paris in January 2017 to postpone the workshops and to concentrate them in October 2017.
By doing this, the maximum of the newly hired ESRs could attend the workshop. Moreover, it is more convenient to congregate their workshop-related travels in one given time period. This decision and its explanation were communicated to the Project Officer Cathy Souto-Enriquez and were accepted.

1.4. Deliverables

The eight deliverables required until January 2018 are all on the Participant Portal and the seven deliverables submitted before the end of December 2017 have been approved.

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Status of the eight deliverables required before January 2018

WP No	Del Rel. No	Del No	Title	Lead Beneficiary	Nature	Dissemination Level	Est. Del. Date (annex I)	Receipt Date	Approval Date	Status
WP7	D7.11	D35	Supervisory Board of the network	CNRS	Other	Confidential, only for members of the consortium (including the Commission Services)	28 Feb 2017	05 Dec 2017 ⚠	06 Dec 2017	Approved
WP7	D7.12	D36	Consortium Agreement	CNRS	Report	Confidential, only for members of the consortium (including the Commission Services)	28 Feb 2017	21 Feb 2017	30 Oct 2017	Approved
WP7	D7.2	D26	Setup of the ENIGMA website	CNRS	Other	Public	31 Mar 2017	15 Mar 2017	30 Oct 2017	Approved
WP1	D1.1	D1	NEC - Requirement No. 1	CNRS	Ethics	Confidential, only for members of the consortium (including the Commission Services)	30 Jun 2017	08 Jun 2017	30 Oct 2017	Approved
WP1	D1.2	D2	EPQ - Requirement No. 2	CNRS	Ethics	Confidential, only for members of the consortium (including the Commission Services)	30 Jun 2017	22 Nov 2017 ⚠	22 Nov 2017	Approved
WP6	D6.3	D16	1st workshop	ULG	Report	Public	31 Jul 2017	20 Nov 2017 ⚠	13 Dec 2017	Approved
WP6	D6.4	D17	2nd Workshop	CNRS	Report	Public	30 Sep 2017	20 Nov 2017 ⚠	13 Dec 2017	Approved
WP7	D7.3	D27	Completion of the recruitment process	CNRS	Other	Public	30 Sep 2017	18 Jan 2018 ⚠		Submitted

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Explanation of the delays for the submitted and approved deliverables D7.11 - D35, D1.2 - D2, D6.3 - D16, D6.4 - D17, D7.3 - D27

- *WP7:* D7.11 - D35 Supervisory Board of the network
  This deliverable was submitted on time (February 2017) but following the Coordinator's request, it was rejected by the Project Officer Emanuela Galeazzi to update the members list.
  Indeed, a Partner's representative was changed due to the departure of the previous representative to another institution. Therefore, it was submitted again, updated, on the 5th of December 2017.

- *WP7:* D7.12 - D36 Consortium Agreement – on time
- *WP7:* D7.2 - D26 Setup of the Enigma website – on time
- *WP1:* D1.1 - D1 NEC Requirement n°1 – on time

- *WP1:* D1.2 - D2 EPQ Requirement n°2
  This deliverable was submitted on time (June 2017) but was rejected by the Project Officer Luisa Marconi to add precision to some elements. After modification by the Coordinator, it was approved in November 2017.

- *WP6:* D6.3 - D16 Workshop 1 held
  As described and explained in section *1.3. Training courses*, the workshop 1 was delayed therefore the deliverable report was also delayed.

- *WP6:* D6.4 - D17 Workshop 2 held
  As described and explained in section *1.3. Training courses*, the workshop 2 was delayed, therefore the deliverable report was also delayed.

- *WP7:* D7.3 - D27 Completion of the recruitment process
  The recruitment process was finished in September 2017. All the ESRs were supposed to start before December 2017.
  However, one candidate withdrew their application for ESR1 in September 2017. This implied a relaunch of the recruitment process in order to find a new candidate, who started their PhD in December 2017.
  Another applicant had issues with their visa; they also started their PhD – ESR6 only in December 2017 (all details in the Completion of the recruitment process report).
  Therefore, in agreement with the Project Officer Luisa Marconi, the Coordinator submitted the recruitment process report only after completion of it in January 2018.

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2. Recruitment strategy

1. *Organization of recruitment process (advertisement for open positions, central selection or by each beneficiary; number of applications, country distribution, gender etc.)*
2. *Selected candidates (visa issued etc.)*
3. *Any delays in recruitment, deviations from the original plan and corrective measures implemented.*

In Annex 2, the completion of the recruitment process report details the organization of the recruitment process and presents some numbers and figures detailing the application process results.

2.1. Organization of recruitment process

Initially, the search for appropriate candidates was based on normal recruitment strategies (e.g., publication on ec.europa.eu/Euraxess, Nature Job ads, AGU and EGU ads, Newsletters, Universities and partners' websites, Engineer schools and Masters Alumni and student associations, etc.)

For each round, the pre and final selection were made in a collective, fully transparent process, led by the Selection Committee (SC, see the Selection Panel members in the Table 1.). The following process was used:

Where the rounds have taken place and how the candidates were interviewed

The candidates applied for a maximum of three specific ESR projects and listed their order of preference. Applications were made through an online, eligibility-proof form on the ENIGMA website. They provided all requested information including a detailed CV.
The supervisors marked the online applications with an A/B/C rank in terms of potential for Enigma as a whole, on a shared online common file also listing useful information about the applications. They then provided the names of their preferred candidates to the SC, which in turn produced a short list of candidates who were interviewed.
Each A candidate was interviewed by the concerned ESR supervisors who were interested in their application (when the ESR was indicated as one of the three preferred positions) via Skype and then if relevant, at the concerned beneficiary's premises.

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After a thorough evaluation, the candidates were ranked and a collective decision was made. Multiple offers from different institutes were coordinated and rendered at the same time. In this way, a team of ESRs with complementary profiles was assembled.
Following this selection process, there were three rounds of evaluation: in January 2017, March 2017 and July 2017.
At the end of the recruitment evaluation rounds, all choices for ESRs were finalized and they were recruited. The detailed list is provided Table 2.

However, one candidate: Sruthi Sathyadevan, for ESR1 informed the supervisors that she withdrew her application in September 2017. All the administrative procedures regarding contracting and visa application were stopped and the recruitment process for ESR1 was relaunched in September 2017. This changed some final numbers about the applications results.

Selection Committee: Panel members for all the rounds:

Philippe Davy	Project Coordinator
Olivier Bour	1. CNRS Rennes
Damien Jougnot	CNRS Paris
Jesus Carrera	2. CSIC Barcelona
Sander Huisman	3. Forschungszentrum Jülich, Agrosphere Institute IBG-3
Jan Fleckenstein	4. Helmholtz Centre for Environmental Research
Frederic Nguyen	5. University of Liège
Carsten Leven-Pfister	6. University of Tübingen
Majken C. Looms Zibar	7. University of Copenhagen
Niklas Linde	8. University of Lausanne
Philip Brunner	9. Neuchâtel University
Cédric Champollion	University of Montpellier
Bruno Desruelle	10. µQuans
Caroline Darcel	11. Itasca Consultants S.A.S.
Athena Chalari	SILIXA

Table 1: Selection Committee (SC)

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2.2. Summary of the recruited ESRs (rounds 1 & 2 & 3):

		Surname Name	Position	Start	Nationality	How did you find information about this ITN?
1	Mr	Richard Hoffmann	ESR11	01/05/2017	German	Newsletter of "Praxisinitiative Aachener Geowissenschaftler"
2	Ms	Veronika Rieckh	ESR13	01/07/2017	Austrian	Mailing list
3	Mr	Guillerme Nogueira	ESR02	01/10/2017	Brazilian	Personal contact
4	Mr	Joel Tirado Conde	ESR07	01/05/2017	Spanish	Copenhagen portal
5	Mr	Jorge Lopez Alvis	ESR15	01/06/2017	Mexican	Newsletter
6	Mr	Alejandro Fernandez Visentini	ESR09	01/09/2017	Argentinean/Spanish	Personal contact
7	Mr	Satoshi Izumoto	ESR12	01/07/2017	Japanese	Personal contact
8	Mr	Peleg Haruzi	ESR10	01/08/2017	Israeli	http://www.earthworks-jobs.com
9	Ms	Justine Molron	ESR04	Between 28/08/2017 and 01/09/2017	Belgian	Linkedin (F. Nguyen)
10	Ms	Lara Blazevic	ESR05	01/09/2017	Croatian,_Venezuelan	http://www.earthworks-jobs.com
11	Ms	Anne-Karin Cooke	ESR08	28/08/2017	German/British	AGU_Website
~~12~~	~~Ms~~	~~Sruthi Sathyadevan~~	~~ESR01~~	~~September 2017~~	~~Indian~~	~~?~~
13	Ms	Andrea Palacios	ESR14	01/09/2017	Venezuelian	http://www.earthworks-jobs.com
14	Mr	Álvaro Pardo Álvarez	ESR3	September 2017	Spanish	Personal contact
15	Mr	Behzad Pouladi	ESR6	December 2017	Irani	http://www.geo.uu.nl/hydrogeology/vacancies.html
	Mr	Kevin de Vriendt	ESR01	December 2017	Belgium	Advertisement at Uni Goettingen

Table 2: List of the recruited ESRs

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2.3. Conclusions about the recruitment process

In conclusion:

- *Six female ESR (40%) and nine male ESR (60%) were recruited before the departure of Sruthi Sathyadevan*

- Finally, with the recruitment of Kevin de Vriendt, there are:
  Five female ESR (33.3%) and ten male ESR (66.7%) recruited

- 13 ESRs started their PhDs before October 2017.

Kevin de Vriendt started ESR1-PhD in CSIC Barcelona in December 2017. After some visa issues, Behzad Pouladi finally started ESR6-PhD in CNRS Rennes in December 2017.

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3. Career development plan for each recruited researcher

Have supervision arrangement and career development plan been agreed on for each recruited researcher? Please provide a short summary.

As indicated in the Grant Agreement as milestone 3, supervision arrangement and career development plans have been agreed on for each recruited researcher with PCDP (Personal Career Development Plan).This milestone was reached in January 2018. ULG (University of Liège) collected all the PCDP on a common file shared with the EPM (European Project Manager).

The European Commission raised some questions about the co-supervision of ESR5 between CNRS Rennes and CNRS Paris, asking for more details regarding the time spent on each of the premises. In order to clarify this point, an Amendement is currently in progress.

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4. Management of the action

Please report on management, kick-off and management meetings, involvement of researchers etc.
Please also report on risks (already identified in the GA or new ones), ethics issues (if applicable) etc.
Would you please also report on any difficulties, issues concerning the implementation of the Workplan due to specific rules related to the beneficiary's administration/ country legislation?

4.1. Meetings of Enigma ITN

As indicated in the Grant Agreement, regular meetings have been organized to prepare and manage the Enigma project.

- A Selection Committee Skype meeting in December 2016 to prepare the start of the project and the advertisement process for recruitment.
  See the complete minutes of the meeting in Annex 3

- Kick-off Meeting n°1
  The Kick-off meeting took place in Paris, on the 30th and 31st of January 2017
  See the complete minutes of the meeting in Annex 3 and the corresponding page on the Enigma website :
  https://enigma-itn.eu/project-overview/meetings/kickoff-meeting-paris/

- An informal Meeting during the EGU (European Geosciences Union) in Vienna in April 2017 to debrief about the ongoing recruitment process and the beginning of the project.
  See the complete minutes of the meeting in Annex 3

- Meeting n°2 in Liège between workshop 1 & 2 in October 2017
  See the complete minutes of the meeting in Annex 3 and the corresponding page on the Enigma website: https://enigma-itn.eu/project-overview/meetings/1st-enigma-meeting-liege-12-13-october-2017/

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4.2. Risks:

About the recruitment:

- There was a delay for the ESR1 due to the late withdrawal of a candidate but finally a new candidate was found and they started on December 16, 2017.

- There were serious issues in procuring a French visa for the Iranian candidate for ESR6. This caused a delay for the start of the PhD in question. The ESR finally was able to start on December 1st , 2017. A letter of support was even provided by the European Commission to facilitate visa access in order to grant the student the possibility to join workshops 3 & 4 in Switzerland. The French administration finally provided a longer visa to the student in January 2018.

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5. Communication Activities

Please provide information on dissemination and public engagement activities if any has been organized so far.

Dissemination and public engagement activities:

- A website was created for the Enigma project to disseminate the project's purpose and to communicate information about the network, job offers, events and workshops. The website is regularly updated online, it is available at https://enigma-itn.eu/.
  For each ESR and their project, dedicated webpages are now online in the menu "People" → Research Fellows and Research Projects.

- There were informal discussions and advertisements during well-known scientific events which are detailed in Annex 4:

  - At EGU 2017 (European Geosciences Union) in Vienna (Austria) a flyer was distributed and an informal meeting was organized.

  - At AGU 2016 and AGU2017 (American Geosciences Union) in San Francisco and New Orleans (USA) flyers were distributed and informal meetings were organized.

  The corresponding flyers are in Annex 4.

- About the social networks: Damien Jougnot (CNRS Paris), the tutor appointed to the ESRs during the Enigma meeting n°3 in Liège and the ESRs, created Enigma profiles and groups on social networks :

  Please have a look at:
  - the Enigma ITN profile created by Damien Jougnot and the ESRs on ResearchGate!
  - the hashtag #ENIGMAITN created on Linkedin and Twitter by the ESR to communicate about their activities!

- Some ESRs already participated in some scientific conferences.
  For instance, ESR7 Joel Tirado Conde presented a poster to the 33rd Nordic Geological Winter Meeting 2018 in Copenhagen.

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Another example : ESR10 Peleg Haruzi is a member of the "RWTH Aachen SEG Student Chapter" and a member of the board: see the Chapter website: https://rwthseg.wixsite.com/rwth-seg/board

- An e-newsletter is in preparation for the Enigma network by the ESRs with the help of the EPM (European Project Manager).

- The Summer School in Cargèse; Corsica (June 2018) is in preparation. The communication and advertisement process has already started within the international scientific community. A website was created: Cargèse2018 website and flyers were distributed during the AGU 2017 (see Annex 4)

- The network H+, coordinated by the CNRS in France, published an article in the *Geologues* periodical of the French Geological society about the experiments of the H+ network, its database, and the Enigma network. It should be online in February 2018.

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6. Impact of the Action

Please describe the impact of the action on the recruited researchers and on the institutions involved or on the completion of the European Research Area.

In the Grant Agreement, there are three principal sections developed in the Impact of the Action part.

1. In the frame of the first section "Enhancing the career perspectives and employability of researchers and contribution to their skills development", Enigma ITN has already achieved one objective: a top-level doctoral training has been launched. The recruitment of 15 young researchers is now complete.

2. In the frame of the second section " Contribution to structuring doctoral / early-stage research training at the European level and to strengthening European innovation capacity", Enigma ITN has already achieved five objectives :
    a. As the 15 projects have now started, the network is developing interactions between the Enigma members and a global collaboration.
    b. Common decisions have been taken within the network about the datasets. There is an ongoing reflection about data formatting, data storage strategies in the existing databases, and link creation between the databases. One beneficiary already created a new database access within the H+ database:
    After discussions between ESR11, ESR15, EPM and T.Hermans (Liège), A.Battais (Rennes IT engineer), ULG has now a functional database for the data that will be collected in Hermalle (link to the web access of this page).
    CSIC is also discussing with the H+ database IT engineers to create a database repository for Argentona (CSIC experimental site).
    c. Moreover, the training courses during the workshops were also opened to other students, for instance in Ploemeur, there were 19 other participants.
    d. Industrial partners contributed to the training events: Itasca and Muquans presented their ongoing work to the ESRs during the workshop 2.

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e. Interactions have been launched thanks to the workshops: for instance, the ESR11 Richard Hoffmann learned about the mobile chemical laboratory developed by the University of Rennes. In the framework of ENIGMA, the mobile lab will be made available to him for his future tracer test experiments.

3. In the frame of the third section " Quality of the measures to exploit and disseminate the project results", Enigma ITN has already achieved several objectives :
   a. To ensure the visibility of the network, a website has been created with all relevant information, updated news about the events…
   b. The 15 young hired researchers participated in two workshops (except for two of them, for more details please see section 2). They received hands-on training courses about innovative field experiments in geophysics and in hydrogeology in a sedimentary geological environment and in a fractured geological environment. They experimented with innovative devices and methods.
   c. The ESRs were also trained to use the H+ database and thus were initiated to discussions about the data formats and data storage.
   d. The question of the intellectual property (IP) has not been addressed at this stage of the project. This will be discussed during workshop 5 in Barcelona.
   e. The Enigma ITN members are actively communicating about the project and their research. The coordinators and the supervisors advertised about the project during scientific international conferences (AGU, EGU…). The website has been created. The ESRs created and they update Enigma pages on social networks.

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Table of appendices

Annex 1: Presentations during workshops/meeting in Liège 2017 by ESRs

Annex 2: Completion recruitment process report

Annex 3: Meetings of Enigma ITN

Annex 4: Communication& Dissemination

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Annexes

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Annex 1

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ITN Enigma

ESR Projects

Presentation during the first meeting with the ESRs

ENIGMA meeting n°2

ENIGMA/GA 722028

Liège, October 12 &13, 2017

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ITN Enigma

Summary

ESR1: **Mixing and chemical reaction hotspots in saline-freshwater mixing zones**
Supervisors: **CSIC Barcelona** / Co-Supervisors: CNRS Rennes, UNIL Lausanne, ACA Barcelona

ESR2: **Imaging flow dynamics and resulting reactivity in the transition zone between streams and riparian aquifers**
Supervisors: **UFZ Leipzig** / Co-Supervisors: UCPH Copenhagen, UNINE Neuchâtel

ESR3: **Closing the observational gap between the hyporheic and meander scale**
Supervisors: **UNINE Neuchâtel** / Co-Supervisors: UFZ Leipzig, GEOTH Heiligenstadt

ESR4: **Flow and transport in fracture networks: reducing uncertainty of DFN models by conditioning to geology and geophysical data**
Supervisors: ITASCA / Co-Supervisors : CNRS Rennes, UNIL Lausanne, SKB Sweden

ESR5: **Monitoring spatio-temporal water redistribution in the subsurface with seismic methods**
Supervisors: **CNRS Rennes**/ Co-Supervisors: UNIL Lausanne, SKB Sweden

ESR6: **Active DTS methods to quantify subsurface flow distribution and dynamics**
Supervisors: **CNRS Rennes**/ Co-Supervisors: CSIC Barcelona, OSU Oregon, SILIXA

ESR7: **Multi-scale thermal imaging of groundwater upwelling in stream valleys**
Supervisors: **UCPH Copenhagen**/ Co-Supervisors: UNINE Neuchâtel, UFZ Leipzig

ESR8: **Monitoring water storage changes with a new portable absolute quantum gravimeter**
Supervisors: **µQuanS** / Co-Supervisors : UM Montpellier, UCPH Copenhagen

ESR9: **Geophysical signatures of spreading and mixing**
Supervisors: **UNIL Lausanne** / Co-Supervisors: CNRS Rennes, CSIC Barcelona

ESR10: **High resolution imaging of transport processes with GPR full-waveform inversion**
Supervisors: **FZI Jülich** / Co-Supervisors: CNRS Rennes, UNIL Lausanne

ESR11: **Joint heat and solute tracer test inversion for imaging preferential pathways**
Supervisors: **ULG Liège /** Co-Supervisors: BRGM Orléans, FZI Jülich

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ITN Enigma

ESR12: **Spectral induced polarization monitoring for in-situ quantification of biochemical reactions**

Supervisors**: FZI Jülich**/ Co-Supervisors: CNRS Rennes

ESR13: **Fully coupled hydrogeophysical inversion of 3D tracer tomography using temporal moments and Ensemble Kalman Filtering**

Supervisors: **UT Tübingen** / Co-Supervisors: ULG Liège

ESR14: **Geologically constrained joint inversion of hydraulic, tracer and ERT data for process visualization**

Supervisors: **CSIC Barcelona** / Co-Supervisors: UCPH Copenhagen, ACA Barcelona

ESR15: **Integration of dynamical hydrogeophysical data in a multiple-point geostatistical framework**

Supervisors: **ULG Liège** / Co-Supervisors: CSIC Barcelona, AQUA Montpellier

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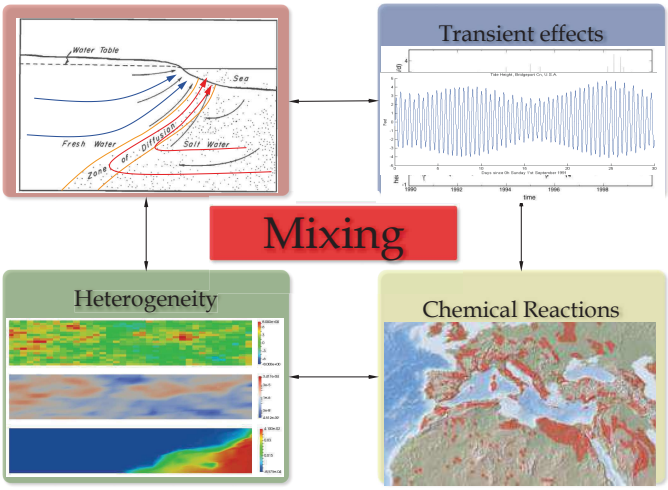
Delay in recruitment process due to unforeseen circumstances

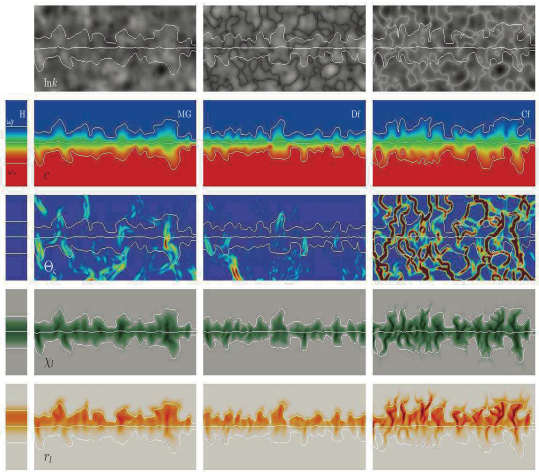
ESR 1

- Kevin De Vriendt (Nationality: Belgium)
- Currently enrolled in Master program “Hydrogeology and Environmental Geosciences at University of Goettingen
- Master thesis: “Kinetic interfacial tracers to determine the interfacial area between wetting and non-wetting fluid phases”
- Starting date: Beginning of December

Mixing and chemical reaction hotspots in saline-freshwater mixing zones



Mixing and chemical reaction hotspots in saline-freshwater mixing zones



Density Effects | Temporal Fluctuations | Heterogeneity | Reactions | Mixing

Quantify the impact of the coupling between density effects and temporal and spatial variability on mixing and chemical reactions in coastal aquifers.

Density effects
Transient Effects
Heterogeneity
Reactions
Mixing

(i) Quantification of flow heterogeneity and fluid deformation

(ii) Identification of flow strain and stress centers, which drive concentration gradients and mixing

(iii) Development of mixing and reaction diagnostics to explain and predict observed reaction patterns.

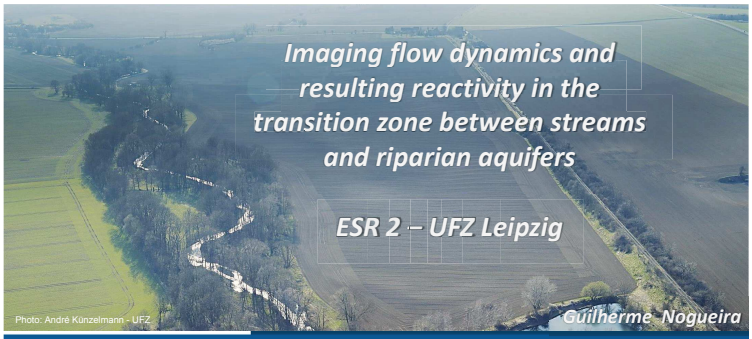
Theoretical Approach

Field Experiments
-Argentona

Numerical Simulations
-2d
-3d

Foreseen secondments

- University of Lausanne (Upscaling geophysical signatures of mixing)
- University of Rennes (Reactive and conservative tracer experiments using micromodels)
- ACA (Saltwater intrusion management)



Nico Trauth, Uli Werban, Jan H. Fleckenstein
ENIGMA ITN Meeting, 12 & 13 October 2017, Liège

ITN Enigma

HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH – UFZ

ESR 2 – PhD candidate

- Guilherme E. H. Nogueira – ***Gui***
  Brazilian, 28 years old

BSc in Geology/Earth Science **(2009-2015)**

UNESP, Rio Claro-SP, Brazil

Laboratory for Watershed Studies (**LEBAC**): Hydrogeology projects, geophysical surveys, GIS, HYDRUS, FeFlow, **BSc thesis** - Numerical simulation of Groundwater Flux using FeFlow.

MSc in Water Science and Engineering **(2015-2017)**

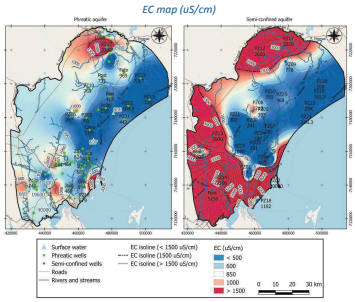
EM joint Programme: Groundwater and Global Change – Impacts and Adaptations – ***GroundwatCH*** (IST-Lisbon, TU-Dresden, UNESCO-IHE (IHE-Delft))

Fieldwork, modelling softwares, internship and short-courses

MSc thesis – "*Tracing the Hydrochemical Water Types and Salinization Mechanisms in the Great Maputo Area as a Function of Recharge, Hydrogeological Properties and Human Activities*"

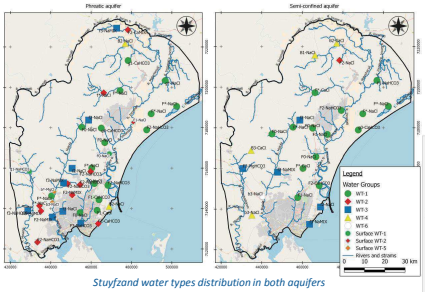
ESR 2 – PhD candidate

- **MSc thesis research**
  - **Recharge assessment** - GIS approach, water budged method, and Cl^- conc.;
  - Groundwater and surface **water sampling campaign**, analyses and interpretation;
  - Classification of **hydrochemical water types** and evaluation of **salinization mechanisms:**
    Statistical tools (HCA); Hydrochemical data;
    Environmental stable isotope (^{18}O and ^{2}H) and Br^-;
    Conservative mixing models, PhreeqC simulations;
  - Main hydrochemical controlling processes:
    Evaporation, and **Ca-dissolution** and **Si-weathering** in fresh waters;
    Mixing (and cation exchange) **with trapped seawater** (transgression periods) in brackish/salt waters;
    –> Results supported by geophysical surveys (VES) and previous researches

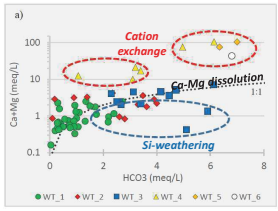


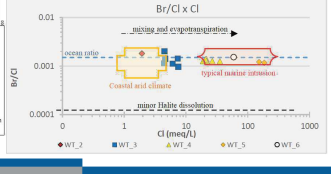
- **MSc thesis research – some results**

Main water groups, processes and salinity origins



Stuyfzand water types distribution in both aquifers





ESR 2 – Helmholtz-Centre for Environmental Research – UFZ, Leipzig

"Imaging flow dynamics and resulting reactivity in the transition zone between streams and riparian aquifers"

- *Supervisors: Jan H. Fleckenstein, Uli Werban, Nico Trauth*
- *Field site: TERENO Selke intensive field site*
- *Secondments:*
  - *Uni. Copenhagen: Imaging GW-SW exchange at nested scales (K. Jensen)*
  - *Uni. Neuchâtel: Geostatistical modelling of heterogeneity (P. Brunner)*
- *Collaborations with ESRs 6, 7, 12, 13 on geophysical and thermal imaging*

ESR 2 – Helmholtz-Centre for Environmental Research – UFZ, Leipzig

Understanding the links between physical controls and biogeochemical process patterns in riparian aquifers

Physical controls

- *Aquifer characterization (stream-GW connectivity, aquifer heterogeneity)*
- *Flow characterization of riparian aquifer (GW-velocity, travel times, preferential flow paths)*

Methods:

- *hydrogeological tests, geophysics*
- *time series analysis of natural tracers (EC)*
- *conservative salt tracer tests*
- *…in combination with ERT*
- *Numerical groundwater flow model*

Biogeochemical processes

- *Aerobic and anaerobic reactions (e.g. denitrification) in the riparian zone*
- *Transport and concentration of reactants (carbon, O_2, NO_3^-,…)*
- *Turn-over capacity of riparian zones*

Methods:

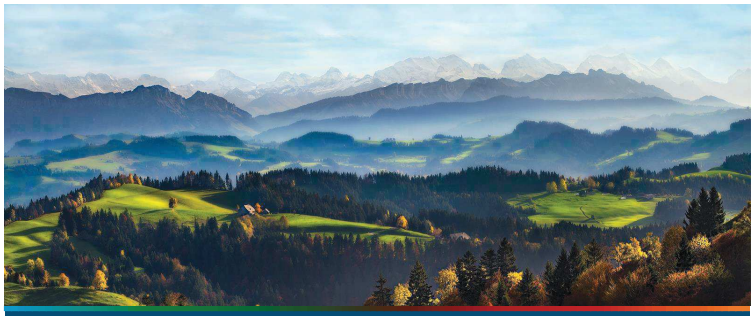
- *Time series analysis of reactive solutes (O_2, NO_3^-, carbon)*
- *Isotopes of N- and C - species*
- *Reactive tracer tests (e.g. ^{15}N addition)*
- *Reactive transport modelling*

Thank you !!

Guilherme N.
guilherme_ehn@hotmail.com

2017 ENIGMA ITN Fall Meeting

ESR3



INDEX

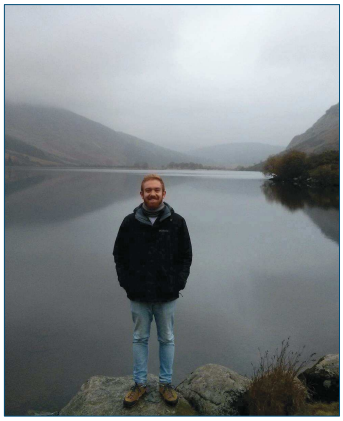
1. Introduction
2. Master Thesis
3. PhD 3
4. Secondments

1. INTRODUCTION

- Name: **Álvaro Pardo Álvarez**
- Age: **26**
- Nationality: **Spanish**

- Academic background:
  - **B.Eng. Civil Engineer**
  - **M.Sc. Water Engineer**

- Interests on the project:
  - To specialize in **hydrogeology** and **numerical modeling**
  - Both academic and business sector **approach**



2. MASTER THESIS

- Title: **Inter-comparison study of PIHM and HYDROTEL – Beyond comparing streamflows**

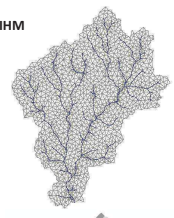
  - Supervised by **Prof. Alain N. Rousseau (INRS, Canada)** / Co-supervised by **Stephane Savary, MSc (INRS, Canada)** and **Xuan Yu, PhD (Delaware University, USA).**

  - **Objectives:** to check whether two different physically-based hydrological models could corroborate observed streamflows while equally representing other processes.

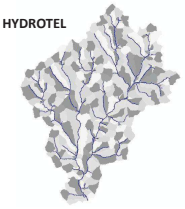
  - **Conclusions:** In general, both models perform similarly on the simulated watershed.

  - Presented at the AGU FALL MEETING San Francisco | 14 – 18 December 2015

PIHM



HYDROTEL

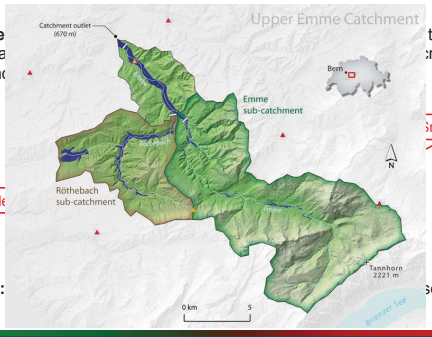


❑ Title: **Closing blind spots for surface water - groundwater exchanges**

- Supervised by **Prof. Philip Brunner (UniNE, Switzerland)** / Co-supervised by **Prof. Daniel Hunkeler (UniNE, Switzerland), Prof. Fleckenstein (UFZ Leipzig, Germany)** and **Elmar Dräger (Geotechnik Heiligenstadt, Germany)**
- **Objective** conceptua to overcome the cross different spatial an
- **Location:** se approaches.

Small spatial-scale

Large spatial-scale

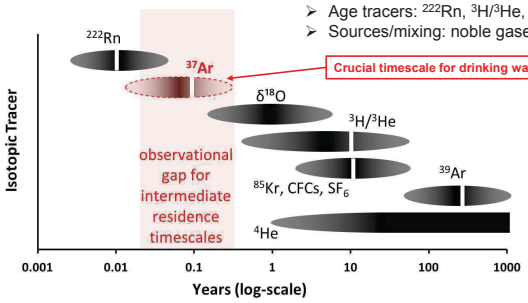


❑ How?

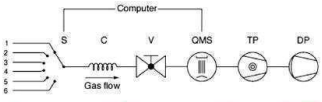
- Use of **tracers methods** to cover characteristic times relevant to the hyporheic and meander scale.

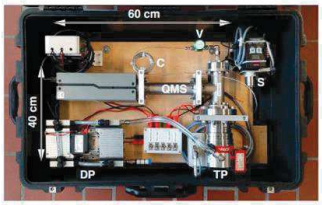
Type of tracers:

- Age tracers: ^{222}Rn, ^{3}H/^{3}He, ^{37}Ar
- Sources/mixing: noble gases, helium isotopes



- How do we measure the mass concentration of gases?





Portable mass spectrometer for the field- analysis of a wide range of gases

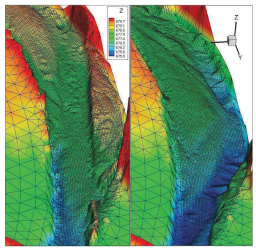
Collaboration with EAWAG (Rolf Kipfer)

❑ How?

- Application of **numerical models**:

HGS™

1. Physically based reach-scale GW-SW model (**HydroGeoSphere**) ⟶ transient hydraulic and biogeochemical boundary conditions for local scale CFD models.
   - Integration of **tracer data** for model calibration
   - Streambed topography: **LIDAR-UAV**



2. Local coupled of CFD code (**OpenFOAM**) for channel flow - subsurface flow, reactive transport model (**MIN3P**) ⟶ local exchange fluxes and reactions between the river-corridor and the hyporheic zone.

OpenFOAM

4. Secondments

- UFZ Leipzig

HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH – UFZ

- Geotechnik Heiligenstadt

geotechnik heiligenstadt gmbh
Beratende Ingenieure VBI

THANK YOU FOR YOUR ATTENTION!

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CH-2000 Neuchâtel
alvaro.pardo@unine.ch
www.unine.ch

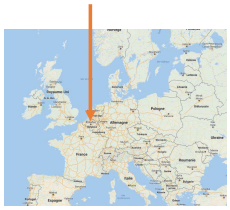
LETTRES ET SCIENCES HUMAINES
SCIENCES
DROIT
SCIENCES ÉCONOMIQUES

ESR3 2017 ENIGMA ITN Fall Meeting 12/10/17

ENIGMA Workshop October 2017

Justine Molron

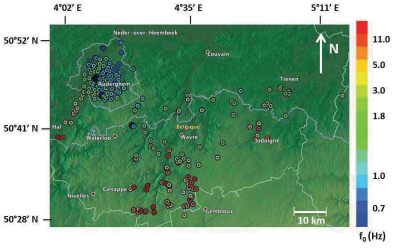
(not a cliche!)



Thickness estimation of sediments overlying the Brabant Massif by H/V spectral ratio analysis in central Belgium (2015)

Royal Observatory of Belgium

CityShark II + séismomètre LE3D-5S

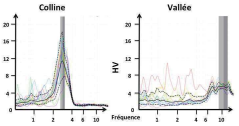


$h = a \cdot f_0^b$

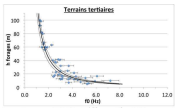
Calibration of power law with boreholes

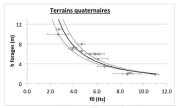
➔ Thickness estimation of sediments where the depth of bedrock is unknown

Variation of impedance contrast with geology => Local power law

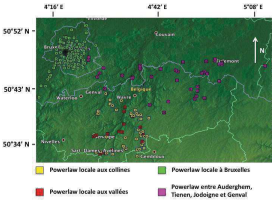


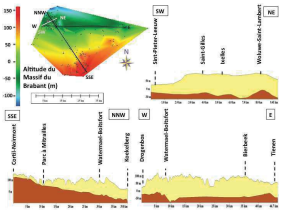
(Geopsy Software)





$h = a \cdot f_0^b$





Modelisation of the topography of the Brabant Massif (Global Mapper)

ESR04 : Flow and transport in fracture networks: reducing uncertainty of DFN models by conditioning to geology and geophysical data (GPR)
(2017-2020)

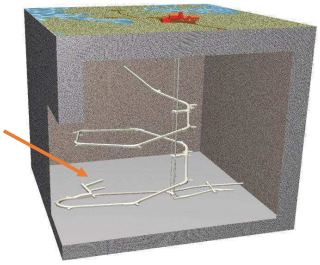
Develop and test a general framework to condition discrete fracture network (DFN) models to geological mapping and geophysical data in order to reduce the uncertainty of fractured rock properties and flow patterns

University of Rennes and Itasca : expertise in DFN modelling

UNIL : expertise in GPR

SKB : Swedish Nuclear Fuel and Waste Management Company

Fieldtrip at the Äspö Hard Rock Laboratory (Sweden) : GPR data acquisition



⇒ **SKB application** : assess confinement properties of the bedrock barrier around canisters for nuclear waste deposal

ESR 5 - Monitoring spatio-temporal water redistribution in the subsurface with seismic methods

LARA A. BLAZEVIC

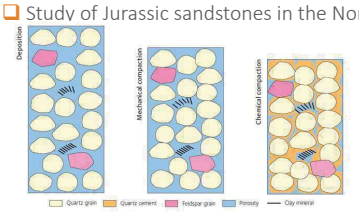
WORKSHOP 1
LIÈGE, BELGIUM
OCTOBER 2017

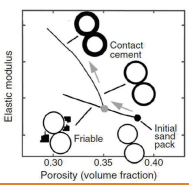
About me

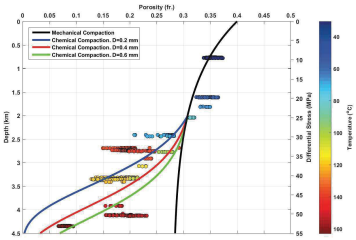
- Geophysical Engineer from Simón Bolívar University (Venezuela)
- Master's degree in Petroleum Geosciences from NTNU (Norway)
- I don't speak French yet ☺ but you can talk to me in:
  - English
  - Spanish
  - Croatian
  - Norwegian

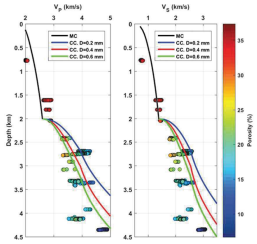
Master's thesis: Burial induced changes in physical sandstone properties

- The physical properties of rocks change with depth due to compaction processes: mechanical and chemical compaction.
- Study of Jurassic sandstones in the North Sea and Norwegian Sea.









- Mechanical and chemical compaction have to be addressed separately.
- Key factors: rock microstructure, pressure regimes, temperature history.

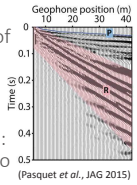
Find the extended abstract at http://library.seg.org/

ESR 5 - Monitoring spatio-temporal water redistribution in the subsurface with seismic methods

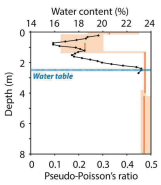
- Supervisors: Ludovic Bodet, Damien Jougnot, Laurent Longuevergne
- Secondments in: UNIL Lausanne, SKB Sweden*
  *GPR+VP/VS experiments on a fracture network at Äspö HRL
- Collaborations with: ESR 4

ESR 5 - Monitoring spatio-temporal water redistribution in the subsurface with seismic methods

- **Concept**: VP/VS or Poison's ratio allow to discriminate fluids in rocks, but this strategy remains underused in near-surface applications.
- **Background**: VP and VS can be estimated from a single acquisition by interpretation of both P- and surface waves.
- **Challenges**: The spatial variability of dry mechanical properties is larger than changes due to water content. Critical zone: transition between unconsolidated media to bedrock.

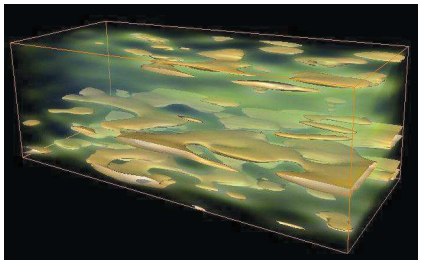


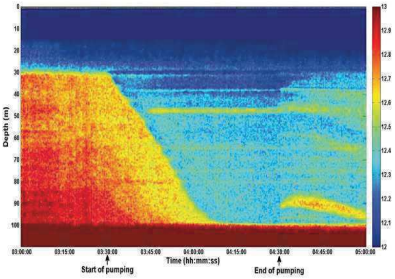
(Pasquet *et al.*, JAG 2015)



ESR 6 : Active Fiber-Optic DTS methods to monitor subsurface flow dynamics

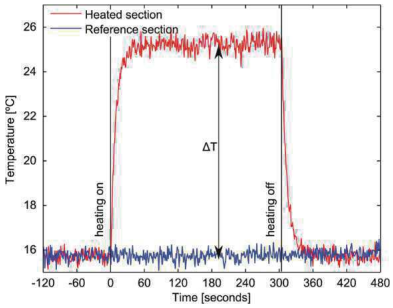
- Passive FO DTS methods allows to locate permeable karst conduits, fracture locations, to quantify borehole flow velocities and to characterize groundwater dynamics or thermal transport.

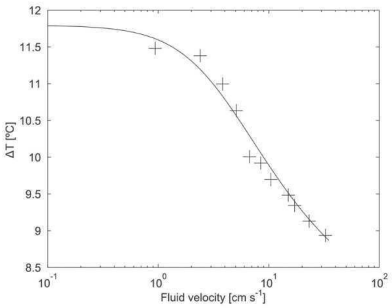




Le Lay et al. (in prep) Characterization of groundwater dynamics in a karst aquifer through Active and Passive Fiber Optic DTS methods

- Active DTS methods are very complementary for quantifying borehole flows in ambient conditions, or related to pumping and cross-borehole flows. By using either a local thermal source or using the armoring of the cable, active DTS methods are much more sensitive to flow.



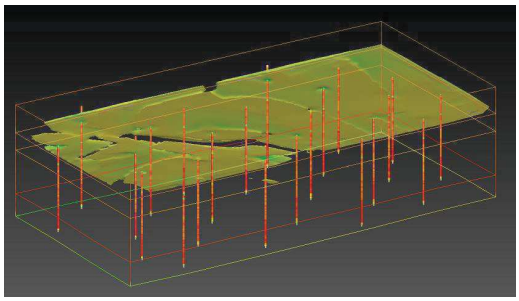


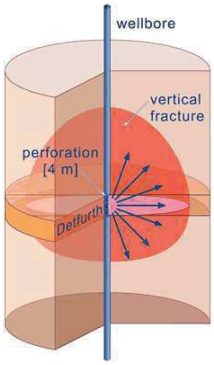
Read et al. (WRR, 2014) Active-Distributed Temperature Sensing to continuously quantify vertical flow in boreholes

ESR 6 : Active Fiber-Optic DTS methods to monitor subsurface flow dynamics

Main objective : Image flow properties and study hydro-thermo-mechanical processes.

- Adapt passive methods in various hydraulic conditions (cross-borehole interference tests, periodic hydraulic tests and ambient conditions) in fractured media (Ploemeur and Äspö sites)
- Develop active DTS methods in buried cables within saturated porous media in order to quantify in-situ fluxes within sandy aquifers (Hermalle site), saline wedges (Argentona site) with the objective of testing an innovative flow tomography approach (also possible within the hyporheic zones at River Selke site for instance). Development of a model of heat transfer in porous media and a model of inversion of distributed flow data)
- Possible extent : analysis of coupled hydro-(thermo-) mechanical processes in fractured media using Distributed Strain sensing (possible applications at Ploemeur and Äspö sites)





1st Enigma ITN ESRs Meeting

Joel Tirado Conde
12th October 2017
Liège

UNIVERSITY OF COPENHAGEN

Introduction

- Joel Tirado Conde (Barcelona)
  - PhD student at University of Copenhagen, Denmark
  - Supervisors: Peter K. Engesgaard and Majken Z. Looms
- BEng Construction Engineering (Civil Engineering), Universitat Politècnica de Catalunya.
- MEng Geotechnical and Earthquake Engineering (specialized in Hydrogeology), Universitat Politècnica de Catalunya.
- Research Assistant, Groundwater Hydrology Group.

UNIVERSITY OF COPENHAGEN

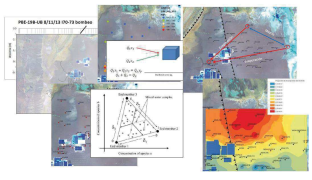
UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Groundwater Hydrology Group GHS DECA idaea

Master thesis

- Design of a hydraulic test in a saline basin

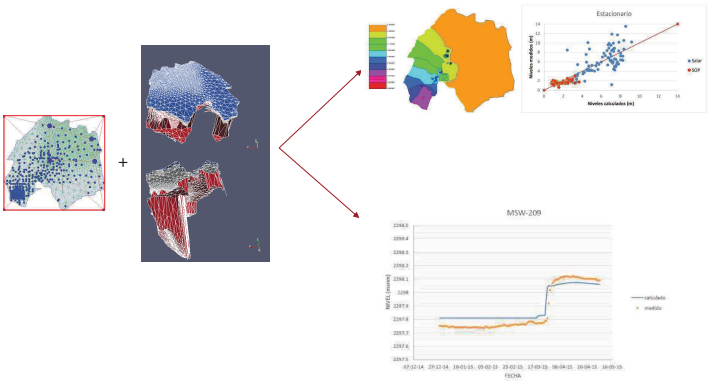
The aim was to design a big scale hydraulic test (pumping test) to obtain information of the groundwater connectivity in a saline karst basin.



Modelling

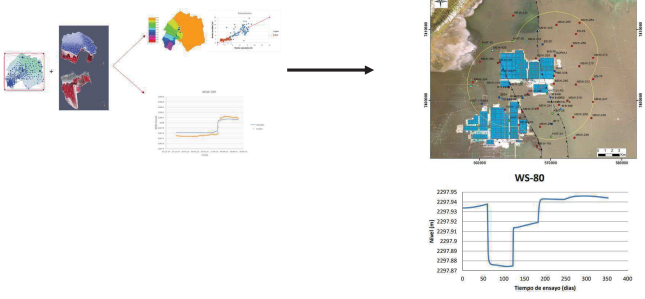
Master thesis

- Design of a hydraulic test in a saline basin



Master thesis

- Design of a hydraulic test in a saline basin



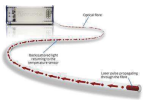
ESR subject

- Multi-scale thermal imaging of groundwater upwelling in stream valleys

The aim is to locate, quantify and model groundwater upwelling in stream valleys, both in the stream and in the surrounding areas, by the use of heat as a tracer (combined with other hydrogeological techniques).

- Locate

Thermal InfraRed camera (drone)



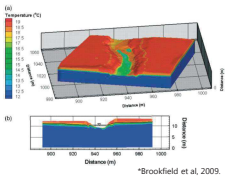
Distributed Temperature Sensing (optic fiber DTS)

- Quantify

Temperature probe
+
Conduction-convection equation

Seepage meter

- Model



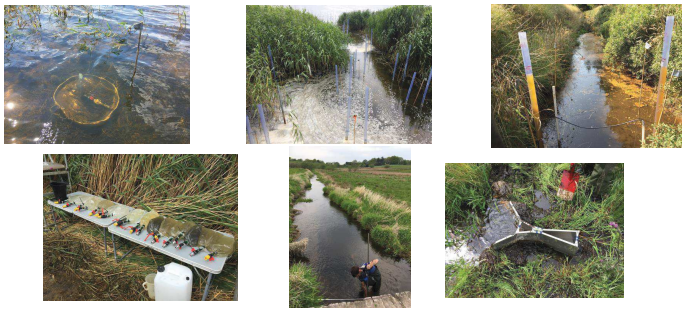
*Brookfield et al, 2009.

Coupled surface water-groundwater and heat transfer model (HGS)

ESR subject

- Multi-scale thermal imaging of groundwater upwelling in stream valleys

The aim is to locate, quantify and model groundwater upwelling in stream valleys, both in the stream and in the surrounding areas, by the use of heat as a tracer (combined with other hydrogeological techniques).



ESR subject

- Multi-scale thermal imaging of groundwater upwelling in stream valleys

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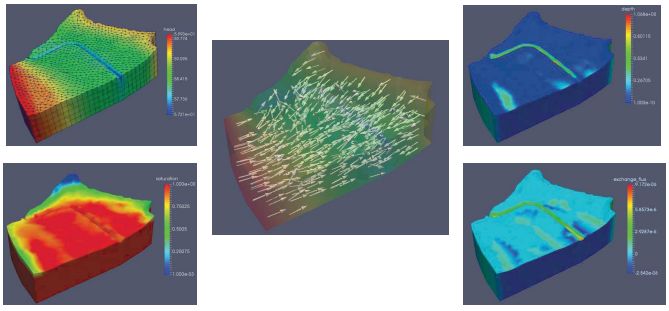


ESR secondments

- Helmhotlz – Centre for Environmental Research – UFZ, Dept. Hydrogeology, Dr. Jan Fleckenstein. 2-3 months during the last half of the 2nd year.

- Univ. Neuchâtel, Dr. Philip Brunner. 2-3 months during the first half of the 3rd year.

ITN Enigma Meeting, Liège Belgium Oct 2017

ITN Enigma

ESR 8: Monitoring **water storage changes** with a new portable **absolute quantum gravimeter**

Anne-Karin Cooke

Supervisors: **Cédric Champollion (Géosciences Montpellier)**
Pierre Vermeulen (Muquans)

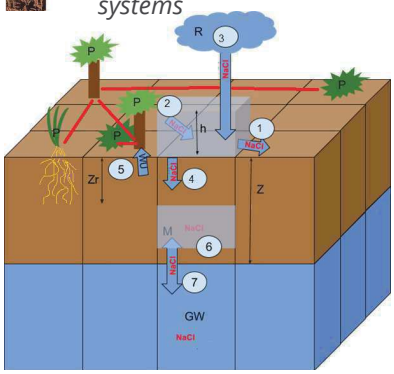
Secondment: **University of Montpellier**

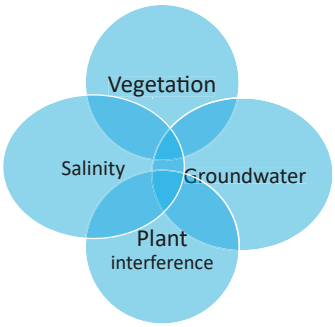
Who am I?

- ***BSc Geoecology*** at Potsdam University, D
- ***MSc Earth and Environment***, *speci.* ***Hydrology*** at Wageningen University, NL
- Internship & thesis at University of Sydney, AU
- **Interests:** (Eco-)hydrology, groundwater, temporal variability of hydrological storages, application of geophysical exploration in hydrology, dryland ecosystem stability, environmental modelling, scientific programming

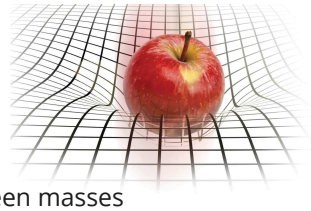
Master thesis

Ecohydrological modelling of vegetation composition in semi-arid ecosystems with shallow saline groundwater systems

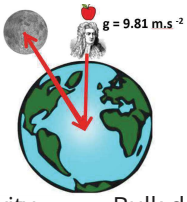


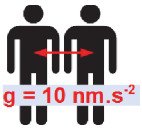


Why gravity?



Acceleration ***g*** due to
gravitational attraction between masses



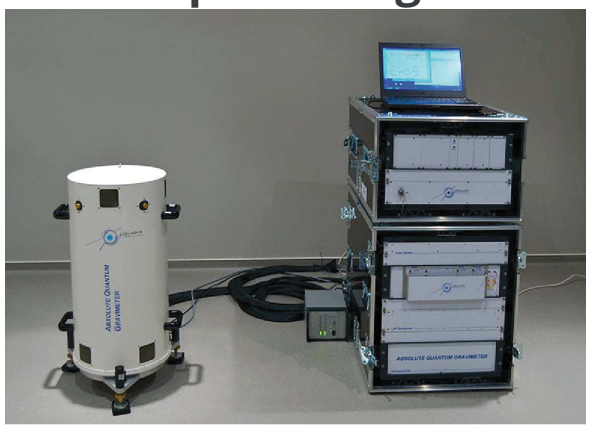


Gravity ⟶ Bulk density ⟶ water content, porosity

Estimation of water storage spatial and temporal variability
General principle : mass balance!

Illustrations after Fores, 2016

Absolute quantum gravimeter



aim: fast, portable (light-weight), user-friendly & accurate !

Outline of the PhD project

1. Testing and validation of new AQG

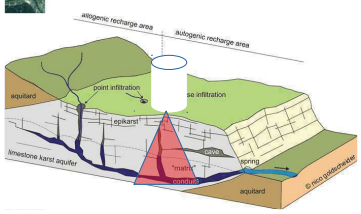
⟹ comparison with FG5 and superconducting gravimeter at Larzac and SYRTE-observatory Paris

2. Design and conduction of a field test scheme: assessment of the impact of temperature, atmospheric pressure, ambient noise

Outline of the PhD project

3. Application in hydrogeological study of water storage variability in karstic aquifers in Larzac and Vaucluse, FR

4. Combination/comparison with cosmic ray soil moisture monitoring (HOBE), DK

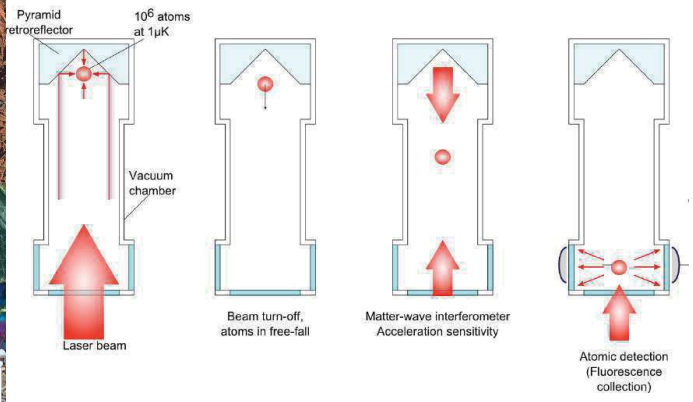


Thank you!

Questions? Suggestions? Let's discuss!
Anne-Karin 'Anneka' Cooke

cooke@gm.univ-montp2.fr
ak.cooke@muquans.com
+33782108467
And anytime during the next two weeks and beyond!

AQG principles



References

Gravity apple:
https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcR1SRVZBtRo4p54dVZUc_I2zAmQx0OBJV_aFCsXbQSIJTPOe_er_g

Cosmic ray:
https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcS4pVhiMu8ptr277zeXlr0ohDsAHE5aY6amykLldtlqJxH8ZFZztQ

Karst: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcS17nJSZ3vQu1LToqiCapYGE-yuEj5pdFV3AyNInrh3S1o2mLS2

1

Early Stage Researcher 9

ITN Enigma

- Alejandro Fernandez.
- Nationality : Argentina.
- Background: Geophysics.
  - Five-years program in Universidad Nacional de La Plata, Buenos Aires, Argentina. *2010-2015.*
    Thesis: Effective elastic thickness calculation in sectors of Southern and Central Andes.
  - M2 Master in Institut de Physique du Globe de Paris (IPGP). Geophysics Exploration Group (GPX) program. *2016-2017*

2

Master thesis

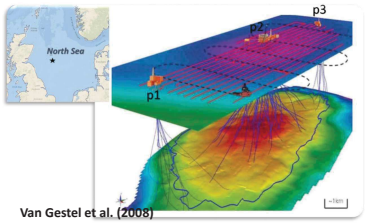
Spatial coherence assessment of the seismic wavefield at the Valhall oilfield using the covariance matrix spectral width

STUDENT: Alejandro Fernandez

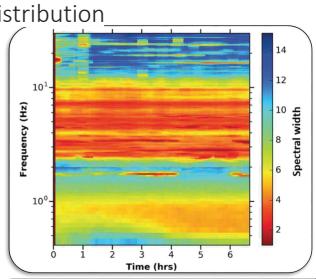
SUPERVISORS: Nikolai Shapiro and Julien de Rosny.

3

Valhall oilfield and spectral width distribution



Van Gestel et al. (2008)



Valhall oilfield:

- 2320 monitoring seismic sensors.
- Production platforms introducing directive seismic noise and precluding reliable application of NSWT.

Coherence characterization of the seismic wavefield:

- Estimated from the eigenvalue distribution of the **covariance matrix**.
- Additional pre processing needed for NSWT.

4

UNIL | Université de Lausanne

ITN Enigma

Geophysical signatures of spreading and mixing

Supervisor: Niklas Linde (University of Lausanne, UNIL)

Primary collaborative partners: Pietro de Anna (UNIL), Yves Méheust (Rennes), Tanguy Le Borgne (Rennes), Damien Jougnot (UPMC Paris), Marco Dentz (CSIC Barcelona)

Motivation

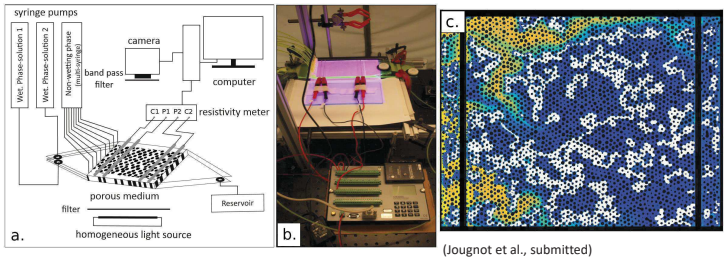
- Field-scale studies (e.g. Singha and Gorelick, 2005) using Electrical Resistivity Tomography (ERT) systematically underestimates solute mass;
- Geoelectrical millifluidic experiments (Jougnot et al., submitted): effective bulk electrical conductivity is strongly affected by pore-scale fluid phase and tracer heterogeneities.

Objectives

1. Theoretically and experimentally study the impact of pore-scale heterogeneities caused by spreading and mixing on bulk physical properties (mainly electrical conductivity);
2. Upscale to the resolution of geophysical tomograms.

Methodology

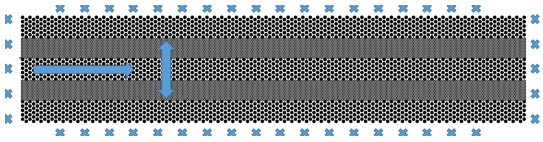
- Experimental approach: geoelectrical milifluidic setup in different types of 2D (Hele Shaw cell) porous media (grain sizes, layerings, etc).



(Jougnot et al., submitted)

First steps

- Literature research (spreading and mixing phenomena, upscaling).
- Learn to use millifluidic facility at UNIL, modelling codes.
- Plan timing and objectives of secondments in University of Rennes and CSIC in Barcelona.
- First experiment: testing mixing effects on bulk electrical conductivity.



Thank you

Peleg Haruzi

ESR 10 - Research Center Jülich

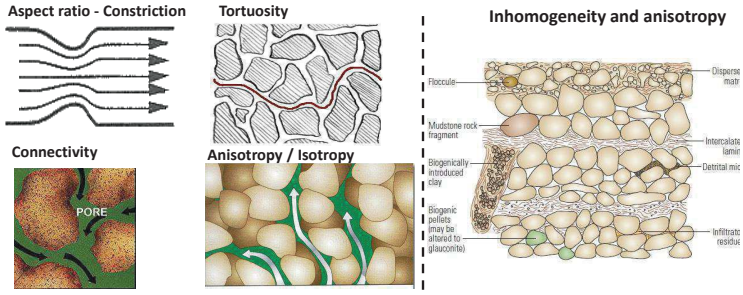
BSc.: Physics, The Hebrew University of Jerusalem

MSc.: Marine Geosciences, University of Haifa

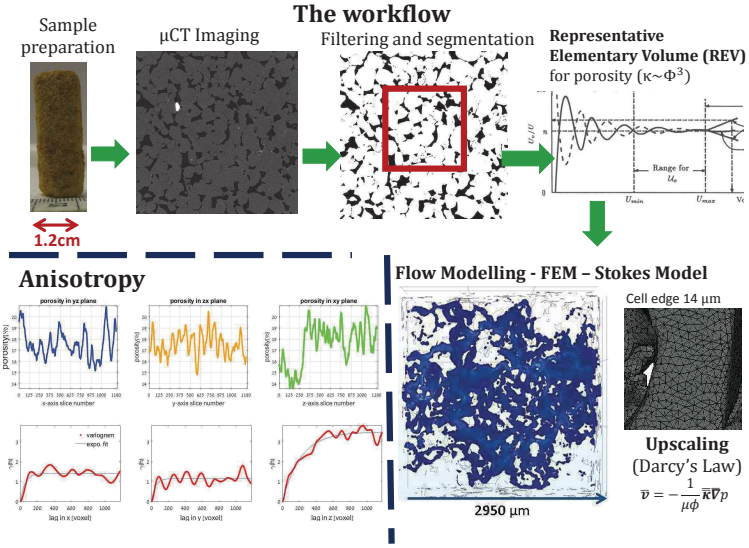
Master's thesis

"Evaluation of Micro- and Macro-Scale Petrophysical Characteristics of Sandstone with Flow Modeling in μ-CT Imaged Geometry"

- to understand the pore-scale controls on Darcy flow characteristics (permeability)

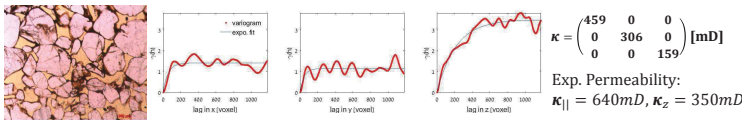


The workflow



Results and conclusions

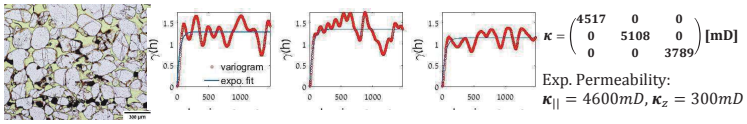
Sample 1: medium Sand, Fe-ox cement



$$\kappa = \begin{pmatrix} 459 & 0 & 0 \\ 0 & 306 & 0 \\ 0 & 0 & 159 \end{pmatrix} [mD]$$

Exp. Permeability:
$\kappa_{||} = 640mD, \kappa_z = 350mD$

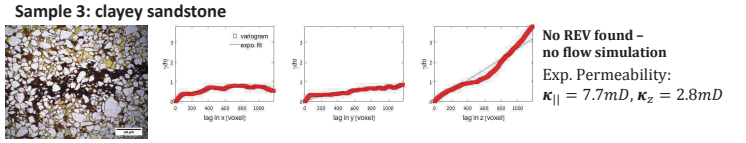
Sample 2: fine Sand, Fe-ox cement



$$\kappa = \begin{pmatrix} 4517 & 0 & 0 \\ 0 & 5108 & 0 \\ 0 & 0 & 3789 \end{pmatrix} [mD]$$

Exp. Permeability:
$\kappa_{||} = 4600mD, \kappa_z = 300mD$

Sample 3: clayey sandstone



No REV found – no flow simulation

Exp. Permeability:
$\kappa_{||} = 7.7mD, \kappa_z = 2.8mD$

- At Darcy scale (cm's) anisotropy is affected by the pore-scale (μm's)
- The cause for anisotropy was grain grading and Fe-ox cementation.

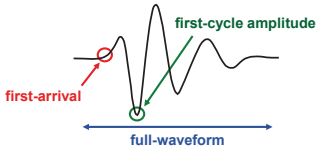
PhD topic

"High resolution imaging of transport processes with GPR full-waveform inversion"

Ray-based methods

Input data:

- First arrival times
- First cycle amplitudes



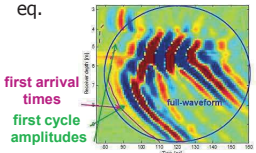
➡ **inexpensive, coarse structures**

FWI in GPR: optimize medium properties to fit the full measured waveform with data obtained from an accurate forward model

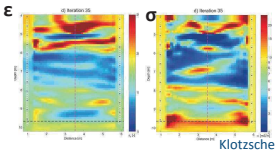
Waveform methods

Input data:

- Significant parts of wavefields
- Inversion based on Maxwell's eq.



➡ **detailed sub-wavelength structures, expensive**

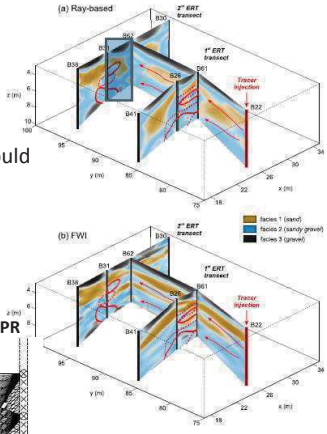


Klotzsche et al., 2010

Topic:

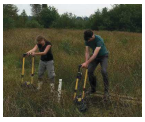
Time-lapse GPR full-waveform of a tracer experiment in Krauthausen

- Recent GPR FWI (Gueting et al., 2017) could explain a plume splitting visualized with time-lapse ERT (Müller et al., 2010).
- In the planned project the tracer will be repeatedly imaged using time-lapse GPR and processed using FWI.

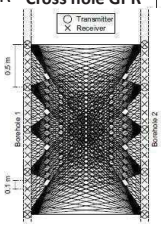


Gueting et al., 2017

Surface GPR



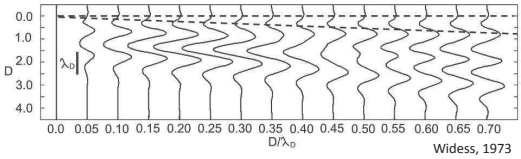
Cross hole GPR



Secondments: CNRS Rennes, UNIL Lausanne

Topic: Thin fracture characterization using GPR full-waveform inversion at the Ploemeur site

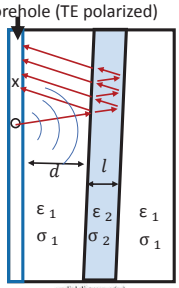
- The received wavelet consists of the constructive and destructive interference of multiple (internal) reflections from a thin layer

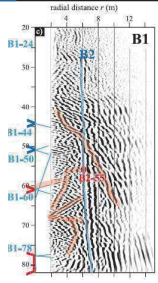


Widess, 1973

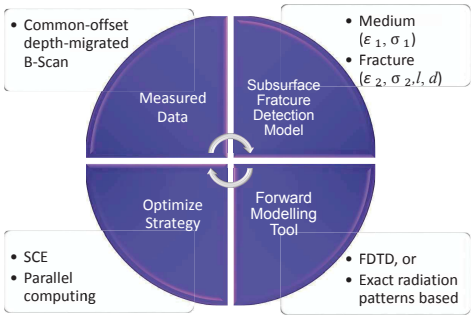
- Fracture apertures and fluid conductivity in the fracture are inhomogeneous; thin fractures reflection coefficients are nonlinear (Shakas et al., 2017).
- Applying FWI on existing GPR data of discrete fracture filled with high electrical conductivity tracer (data from Dorn et al. 2011, Dorn et al. 2012, Shakas et al. 2016).

Single borehole (TE polarized)





Thin fracture characterization



Effective wavelet unknown

Wavelet parameters: [φ, A]

$$\hat{W}_{est}(f_n) = \hat{W}_{est}(f_n) \cdot A \cdot \exp(j\varphi)$$

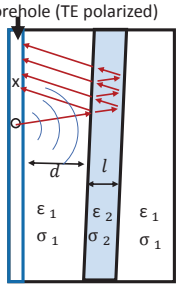
➡ Phase parameters: [$\varepsilon_1, \varepsilon_2, l, d, \varphi$]

Amplitude parameters: [σ_1, σ_2, A]

- Model parameters and wavelet need optimization at same time

Busch et al., 2012, 2014 and Liu et al., submitted

Single borehole (TE polarized)



d is determined for some fixed Ty–Ry location. The actual distance changes each step due to known dip angle

LIÈGE université | UEE Urban and Environmental Engineering

Second ENIGMA ITN meeting

Liège – 12 & 13 October, 2017

ENIGMA Innovative Training Network : **European training Network for In situ imaGing of dynaMic processes in heterogeneous subsurfAce environments**

Presentation of ESR 11

Richard Hoffmann
University of Liege – Hydrogeology & Environmental Geology

Liege, 12/10/2017

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Content

- Self introduction
  - Curriculum Vita – Life
  - Academic History
- Master thesis
  - Hydrogeology at RWTH Aachen
- ESR 11 subject and secondments in ENIGMA ITN
  - Hydrogeology and Environmental Geology at University of Liege

Self introduction - Curriculum Vita I

- Born in Düren (Germany)
  - „the big city“ between Aachen and Cologne
  - Gate to Eifel ⇔ edge of Rhenish mining area

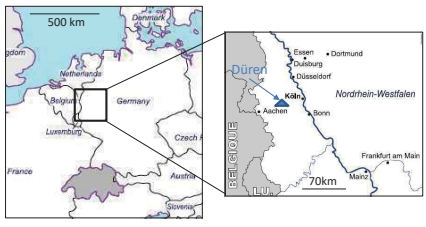


Fig. 1: Map overview home location (ground maps by http://d-maps.com/)

Self introduction - Academic History II

A) Education:	
10.11 - 09.14	B.Sc. Applied Geosciences, RWTH Aachen University (Germany) ⇒ Geophysics – Hydrogeology – Engineering Geology (GHE)
10.14 - 09.16	M.Sc. Applied Geosciences (GHE), RWTH Aachen University
10.16 - 03.17	Attending M.Sc. Courses at RWTH Aachen and sabbatical Period
Since 05.2017	PhD student in Hydrogeology at University of Liege (ESR in ENIGMA)

B) Work & special field trips:	
12.14 - 01.15:	Tutor B.Sc. Course “Introduction to Geophysics” ⇒ by Prof. Clauser, RWTH
08.15 - 09.15:	Joint German – Indonesian field trip to Java, Indonesia (LiH, Aachen)
12.15 - 02.16:	Tutor M.Sc. Courses “Flow + Transport Modeling” and “Data Analysis” ⇒ by Prof. Hendricks-Franssen, FZ Jülich / RWTH)

Master thesis

Testing the implementation of Land subsidence due to ground-water withdrawal in the Rhenish mining area in a numerical FeFlow 7.0 based groundwater model

Supervisor: Univ.-Prof. Dr. rer. nat. T. R. Rüde, Institute of Hydrogeology (RWTH)

Co-Supervisor: Dr. T. G. Demmel, Institute of Hydrogeology (Aachen)

Mentor: Dr.-Ing. M. Heitfeld, Heitfeld-Schetelig GmbH (Aachen)

Main goals:

- Connect geotechnical model (GIESE 2010) with a FeFlow groundwater model
- Work out equations to take Land subsidence on Aquifer/Leakage in account
- Perform semi-automatic "hydrogeotechnical" inversion
- Develop FeFlow Plug in concept for automatic integration of temporal parameter changes

PhD/ESR 11 subject in ENIGMA ITN 2017 – 2020

ESR11: Joint heat and solute tracer test inversion for imaging preferential pathways

Supervisor: Prof. A. Dassargues, Hydrogeology & Environmental Geology, University Liege

Co-Supervisor: Prof. P. Goderniaux, Fundamental and Applied Geology, University Mons

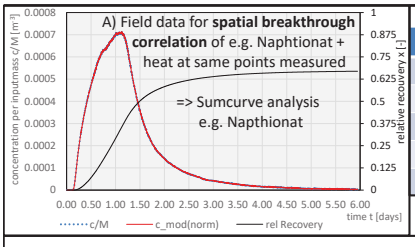
Main objectives:

- Use complementary of heat and solute (variable D_{diff}) tracer for improving predictions
- Joint heat + solute inversion and use Prediction focused approach (HERMANS et al. 2016)
- Assess preferential pathways in aquifers at multiple-scales and their impact on models
- at Hermalle-sous-Argenteau (Porous media) and in Chalk of Mons (Dual Continuum)

Secondmont (around 6 months):

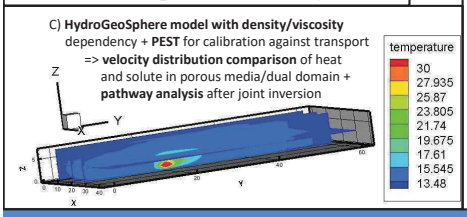
- Hyderabad, India (weathered rocks) – BRGM – Dr. J.C. Maréchal (2018 / 2019)

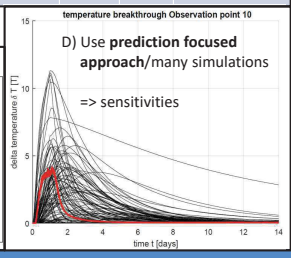
PhD/ESR 11 subject in ENIGMA ITN 2017 – 2020



B) Compare **calculations of breakthrough data**

Readings		Calculations	
t(max)	11640 s	v(max)	$1.72 \cdot 10^{-3}$ m s^{-1}
t(dom)	97365 s	v(dom)	$2.05 \cdot 10^{-4}$ m s^{-1}
t(med)	94005 s	v(med)	$2.13 \cdot 10^{-4}$ m s^{-1}
t($-1\sigma = 0.159$s)	51765 s	D_L	$6.82 \cdot 10^{-4}$ m^2 s^{-1}
t($+1\sigma = 0.841$s)	15825 s	α_L	3.21 m





Thank you for your attention

Literature

- GIESE, S. (2010): Bodenbewegungen infolge von Sümpfungsmaßnahmen für tiefe Tagebaue am Beispiel des Rheinischen Braunkohlereviers. – Schriftenreihe Geotechnik im Bauwesen, **6**: 298 S.; Dissertation am Lehrstuhl Geotechnik im Bauwesen, RWTH Aachen, Aachen

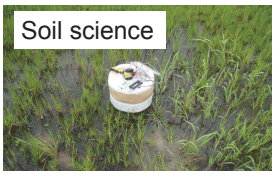
- HERMANS, T., OWARE, E. & CAERS, J. (2016): Direct prediction of spatially and temporally varying physical properties from time-lapse electrical resistance data. – Water Resources Research, **52** (9): 7262-7283

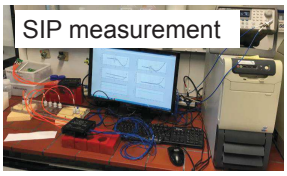
- HOFFMANN, R. (2016): Erprobung der Implementierung der sümpfungsbedingten Bodensetzung im Rheinischen Braunkohlerevier in ein numerisches FeFlow 7.0 basiertes Grundwasser-modell. – Masterthesis, Institute for Hydrogeology, RWTH Aachen: 111 p.; (unpublished).

- HOFFMANN, R. (2014): Bestimmung der grundwasserhydraulischen Heterogenität in Festge-steinen des Hastenrather Grabens (Region Aachen) mit Hilfe von Kurzpumpversuchen. – Bachelorthesis, Institute for Hydrogeology, RWTH Aachen: 98 p.; (unpublished).

Satoshi Izumoto (ESR12)

JÜLICH FORSCHUNGSZENTRUM



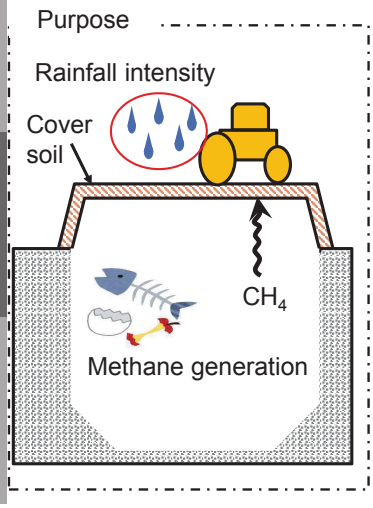


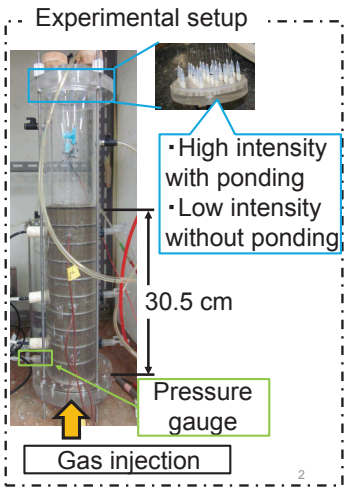
BC,MSc in University of Tokyo

Forschungszentrum Jülich

Member of the Helmholtz Association

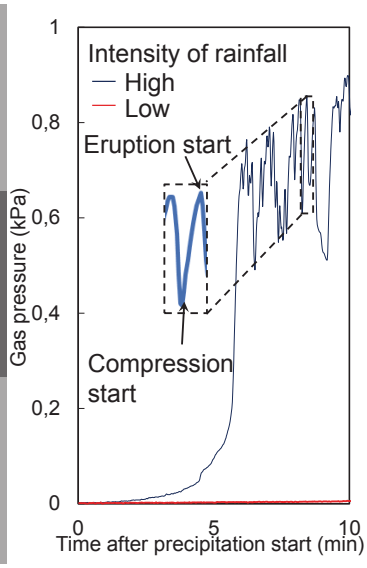
Methane transport in landfill cover soil during rainfall





2

Member of the Helmholtz Association

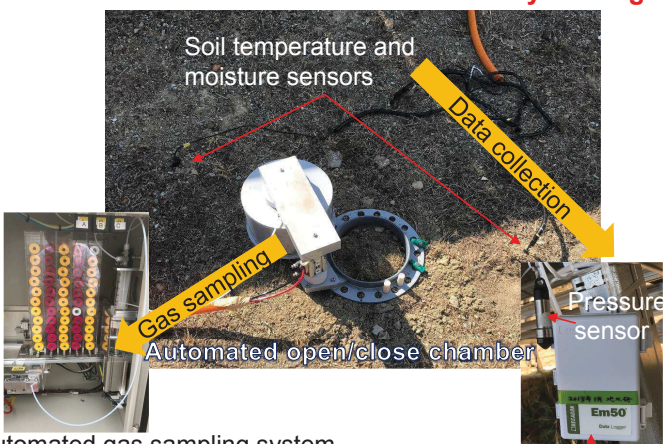


Methane eruption

3

Member of the Helmholtz Association

Methane emission difference between day and night



Automated gas sampling system

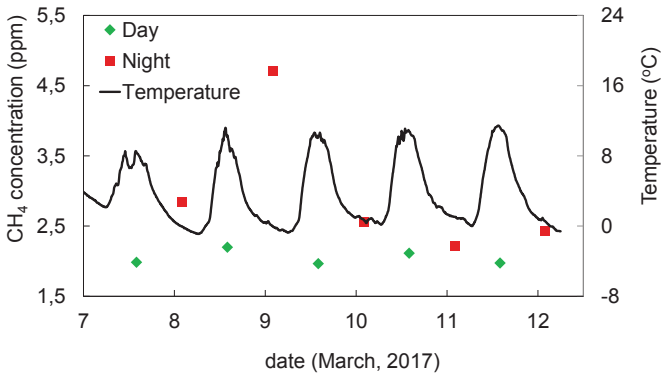
➡ Methane flux / concentration

Data logger

4

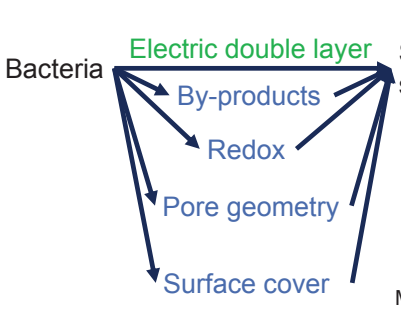
Member of the Helmholtz Association

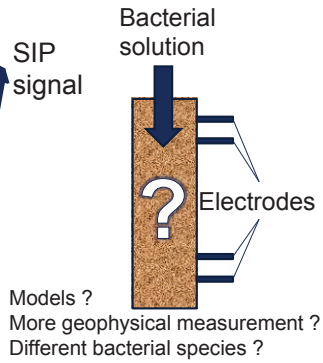
Methane emission difference between day and night



➡ Day / night cycle due to change of methane oxidation rate

Quantification of biochemical reactions with SIP





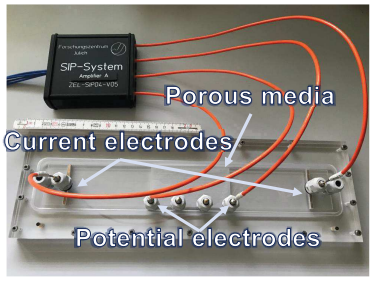
Models ?
More geophysical measurement ?
Different bacterial species ?

Still not clear

➡ How can we quantify each effect due to biofilm separately ?

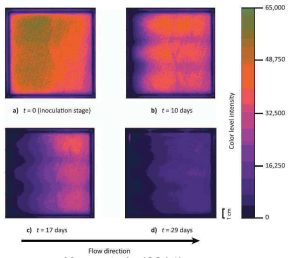
Our plan

✓ Design a micromodel
➡ Visual observation



@Forschungszentrum Julich

✓ Inject bacteria



Kone et al., (2014)

✓ EIT measurement

@CNRS Rennes
(Secondment)

EBERHARD KARLS UNIVERSITÄT TÜBINGEN | FACULTY OF SCIENCE | ITN Enigma

Center for Applied Geoscience - Hydrogeology

ESR13 – Veronika Rieckh
Fully coupled hydrogeophysical inversion of 3D tracer tomography using temporal moments and Ensemble Kalman Filtering

University of Tübingen - supervised by Prof. Olaf Cirpka and Dr. Carsten Leven

Secondment:
University of Liège (or others)

12.10.2017, ENIGMA Meeting, Veronika Rieckh

Veronika Rieckh

BSc. in **Applied Geoscience** at the University of Leoben (Austria)

MSc. in **Applied Geophyiscs** at TU Delft (The Netherlands),
ETH Zurich (Switzerland),
RWTH Aachen (Germany)

Research Interests:
Characterization of the shallow subsurface
Numerical Methods
Inversion

Field Work

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Master Thesis

Jura mountains of Switzerland

⇩

superficial karst structures influences the quality of seismic surveys

⇩

constrain seismics with another geophysical method

⇩

combined data sets of co-located seismic refraction surveys and electrical resistivity surveys

⇩

apply structural similarity constrains to alter the smoothing operator during the inversion

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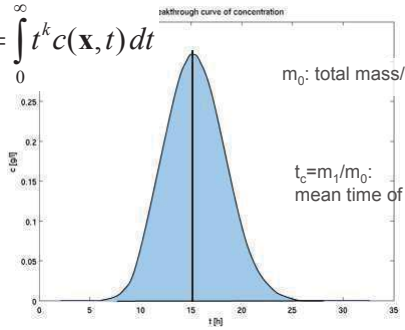
Temporal Moment

$$m_k^c(\mathbf{x}) = \int_0^\infty t^k c(\mathbf{x},t)\,dt$$



m_0: total mass/discharge

$t_c = m_1/m_0$:
mean time of breakthrough

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ENIGMA Research

3D geoelectric survey ensures sensitivity in between boreholes

to ensure **stable** and **fast** inversion

⇩ temporal moments ⇩ Ensemble Kalman Filters

Fully **coupled hydrogeophysical** inversion of **3D tracer tomography** using **temporal moments** and **Ensemble Kalman Filtering**

Current tasks:
Appropriate survey design – temporal and spatial resolution
Forward Modelling

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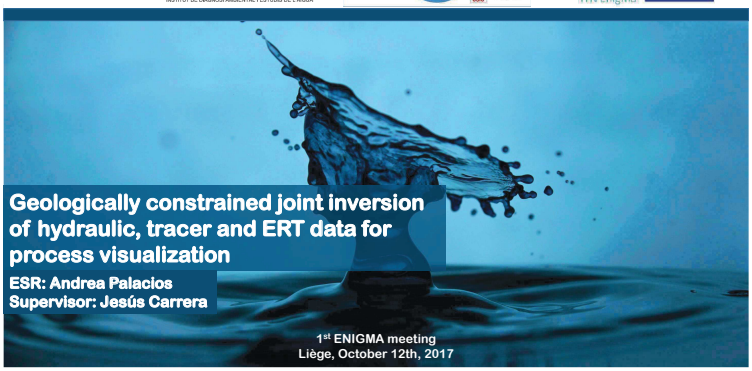
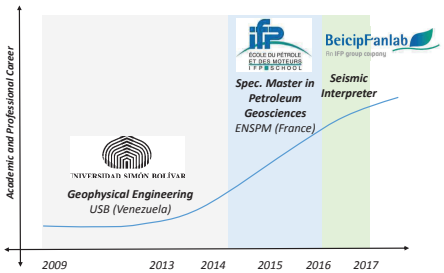


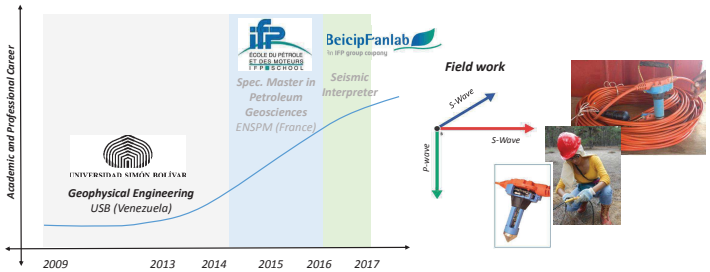
Who am I?

Academic and Professional Background



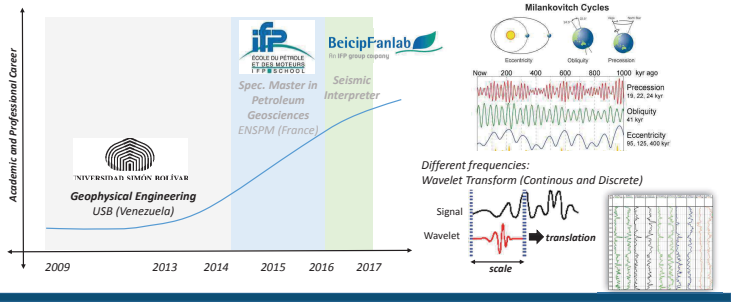
Geopysical Engineer from the Simon Bolivar University, Venezuela

Main geophysical technics for subsurface exploration



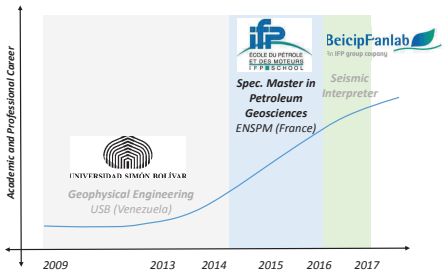
Thesis Project: Multi-scale analysis of well-logging

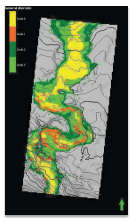
Use of Wavelet Transform to identify the influence of Milankovitch cycles in sedimentation



IFP School: Specialized Master in Petroleum geosciences

To become operational for the industry



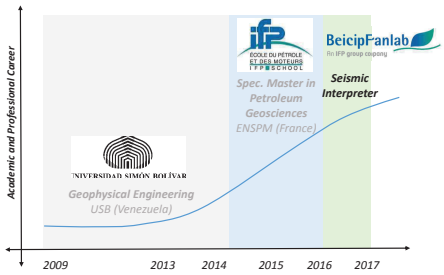


Seismic Facies Modeling

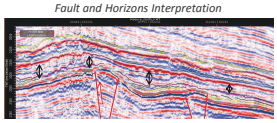
Andrea Palacios (CSIC - IDAEA)

Beicip-Franlab: Seismic Interpreter

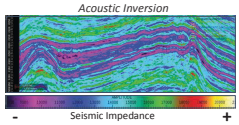
Structural interpretation (faults and horizons) and seismic characterization



Fault and Horizons Interpretation



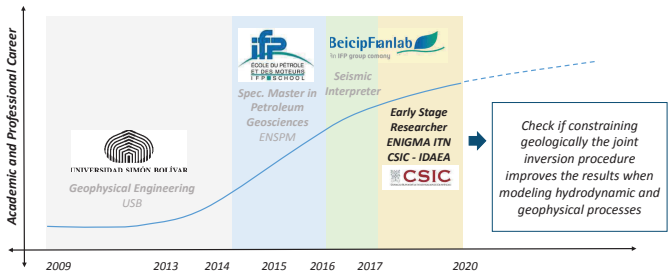
Acoustic Inversion



1st ENIGMA meeting Liège, October 12th, 2017

Andrea Palacios (CSIC - IDAEA)

I am a Geophysicist… trained for the petroleum industry, but ready for hydrology !



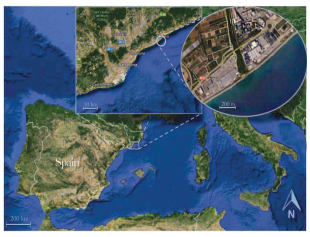
Check if constraining geologically the joint inversion procedure improves the results when modeling hydrodynamic and geophysical processes

1st ENIGMA meeting Liège, October 12th, 2017

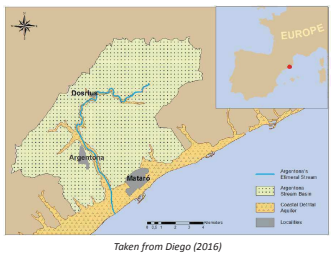
Andrea Palacios (CSIC - IDAEA)

Argentona site: 40 km NE of Barcelona, coastal aquifer

CSIC and Polytechnic University of Catalonia



Taken from Casanovas (2016)

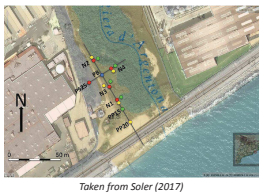


Taken from Diego (2016)

1st ENIGMA meeting Liège, October 12th, 2017

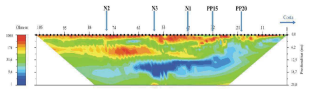
Argentona site: to study hydrodynamics of sea-water intrusion

16 piezometers are in place and measuring

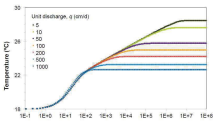


Taken from Soler (2017)

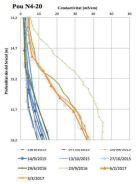
Hydraulic heads, tracer tests



ERT Data



Temperature (CDT and fiber optics)

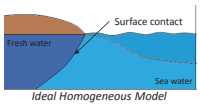


Conductivity

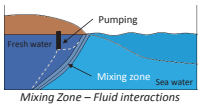
Andrea Palacios (CSIC - IDAEA)

Thesis: Develop and test a new joint inversion method

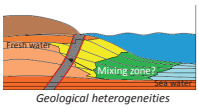
Integrate geological understanding through inversion parameters



Ideal Homogeneous Model



Mixing Zone – Fluid interactions



Geological heterogeneities

Main Objective:

Method for inversion of ***Flow***, ***Heat transport***, ***Electrical conduction*** and ***conservative and reactive solute transport.***

How?

Integrating geological understanding into the model inversion.

Why?

Because geology is complex and can be binding.

Secondment Periods: Work with the University of Copenhagen
A semester is planned during the 3rd year of my fellowship to collaborate with UCPH

1st ENIGMA meeting Liège, October 12th, 2017

ESR 15: Integration of dynamical hydrogeophysical data in a multiple-point geostatistical framework

Jorge Lopez Alvis

Université de Liège

12/10/2017

LIÈGE université | UEE Urban and Environmental Engineering

Background

B.Eng. geophysical engineering (UNAM, Mexico)

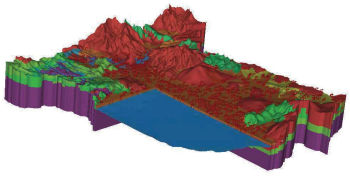
- geophysical methods
- groundwater model calibration

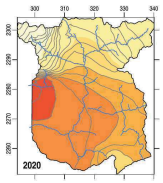
M.Sc. Earth sciences (UNAM, Mexico)

- regional groundwater model

Master thesis

Regional groundwater model for a semi-arid basin





Remarks

- 3D parameterization in complex geological setting
- Surface water-groundwater interaction
- Mountain front recharge

ENIGMA project

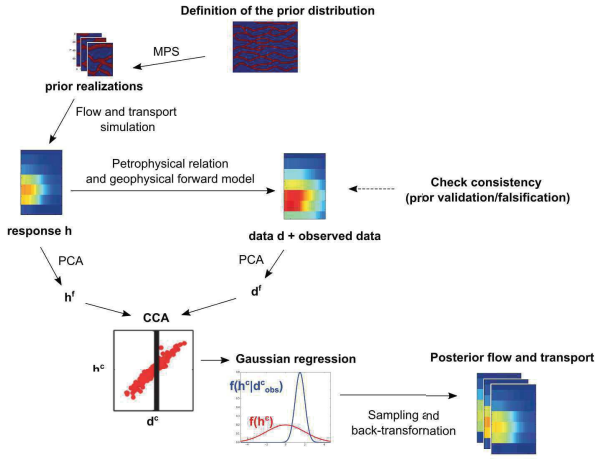
Integration of hydrogeophysical data within a bayesian framework

- Link between geophysical data and dynamic process simulation
- Consider uncertainty in model parameters and predictions

Two main strategies:

- Validation/falsification of prior scenarios
- Prediction Focused Approach (Bayesian Evidential Learning)

PFA and prior validation/falsification



Methods and network

- **Data:** 4D ERT and SIP; GPR and DTS
- **Sites:** HSA and/or Krauthausen, Ploemeur
- **Interactions:** ESRs 13 and 14 from a methodological point of view; ESR6 (DTS) and ESR10 (GPR) datasets will be integrated.
- **Supervisors:** F. Nguyen (ULg) and T. Hermans (UGent)
- **Secondments:** CSIC (joint inversion)and AQUA (technology transfer).

End of Annex 1

Annex 2

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

D7.3 / D27 Completion of the Recruitment Process- Report

Enigma ITN - 2018

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Recruitment Process

Initially, the search for the appropriate candidates was based on normal recruitment strategies (e.g., publication on ec.europa.eu/Euraxess, Nature Job ads, AGU and EGU ads, Newsletters, Universities and partners websites, Engineers schools and Masters alumni and students associations, etc.)

For each round, the pre and final selection were made in a collective, fully transparent process, led by the Selection Committee (SC, see the Selection Panel members in the Table 1). The following process was used:

Where the rounds have taken place and how the candidates were interviewed

The candidates applied for a maximum of three specific ESR projects and listed their order of preference. Applications were made through an on-line, eligibility-proof form on the ENIGMA website. They provided all requested information including a detailed CV.
The supervisors marked the online applications with an A/B/C rank in terms of potential for Enigma as a whole, on a shared online common file with all useful information about the applications. Then they provided the names of their preferred candidates to the SC, which in turn produced a short list of candidates who were to be interviewed.
Each A candidate was interviewed by the concerned ESR supervisors who were interested by the application (when the ESR was indicated as one of the three preferred positions) by Skype and then if relevant, at the concerned beneficiary's premises.

After a thorough evaluation, the candidates were ranked and a collective decision was made, multiple offers from different institutes were coordinated and given at the same time. In this way, a team of ESRs with complementary profiles was assembled.

There were three rounds of evaluation, all following this selection process in January 2017, March 2017 and July 2017.

At the end of the recruitment evaluation rounds, all ESRs were found and recruited. The detailed list is provided Table 3.

However, one candidate: Sruthi Sathyadevan, for ESR1 informed the supervisors that she withdrew her application in September 2017. All the administrative procedures regarding contracting and visa application were stopped and the recruitment process for ESR1 was relaunched during September 2017. This changed some final numbers about the applications results.

This report presents some numbers and figures about the applications results.

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Selection Panel members for all the rounds:

Philippe Davy	Project Coordinator
Olivier Bour	1. CNRS Rennes
Damien Jougnot	CNRS Paris
Jesus Carrera	2. CSIC Barcelona
Sander Huisman	3. Forschungszentrum Jülich, Agrosphere Institute IBG-3
Jan Fleckenstein	4. Helmholtz Centre for Environmental Research
Frederic Nguyen	5. University of Liège
Carsten Leven-Pfister	6. University of Tübingen
Majken C. Looms Zibar	7. University of Copenhagen
Niklas Linde	8. University of Lausanne
Philip Brunner	9. Neuchâtel University
Cédric Champollion	University of Montpellier
Bruno Desruelle	10. µQuans
Caroline Darcel	11. Itasca Consultants S.A.S.
Athena Chalari	SILIXA

Table 1: Selection Committee (SC)

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There were 627 applicants for the three rounds of evaluation

How did you find information about this ITN?

ABG	2
Academicpositions.eu	**35**
AGU Website	1
by Deutsche Geophysikalische Gesellschaft	1
College mailing list	2
complete	1
Contact	1
EGU job platform	9
enigma-itn.eu	**36**
euraxess.ec.europa.eu	**21**
Frédéric Nguyen (LinkedIn)	1
Friend	4
http://www.earthworks-jobs.com	**196**
http://www.geo.uu.nl/hydrogeology/vacancies.html	1
International Association of Rock Physicists web page	1
Internet	43
journal	6
journal and internet	1
naturejobs.com	3
Newsletter	**37**
Other	47
Personal contact	**102**
PoroNet	1
Social Media	6
The Website of University of Stuttgart	1

Table 2 : Communication and ads results

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Main Journals/Networks/Institutions in which common ads were published:

Journal/institutions	Contact	Type of Advert
Nature Job Sciences	website	flyer + list of 15 ESR
academic positions	Vincent Ballet	global (ENIGMA_ITN.docx)
women research science	Damien Jougnot	email/ad
Earth Works	copy@earthworks-jobs.com (= Alison Way)	Global advert
Euraxess	M-Françoise Gerard	Global advert
EGU Jobs	M-Françoise Gerard	email/flyer
Near-surface newsletters	Damien Jougnot	email/flyer
AGU hydrogeophysics technical committee	Damien Jougnot	email format
Interpore	S.M.Hassanizadeh	free adds for members
EAG newsletter	EAG office <news@eag.eu.com>	~ email format (customized, specific registration)
CZEN (Critical Zone Exploration Network)	http://www.czen.org/	the same used for EAG Newsletter/website
Website H+	M-Françoise Gerard	
newsletter CRITEX	O. Bour	CNRS press release
CampusFrance	website	no feed back
Graduateland	M-Françoise Gerard	Global advert
Association Bernard Gregoy	http://www.abg.asso.fr/Desktop.aspx	Global advert

There were also emails of advertisements sent to all Enigma members' contacts and to the scientific Universities/ Engineers Schools, etc…

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Examples of the recruitment advertisement:

1. Print screen example for one of the PhD-ESR offer on the Enigma website:

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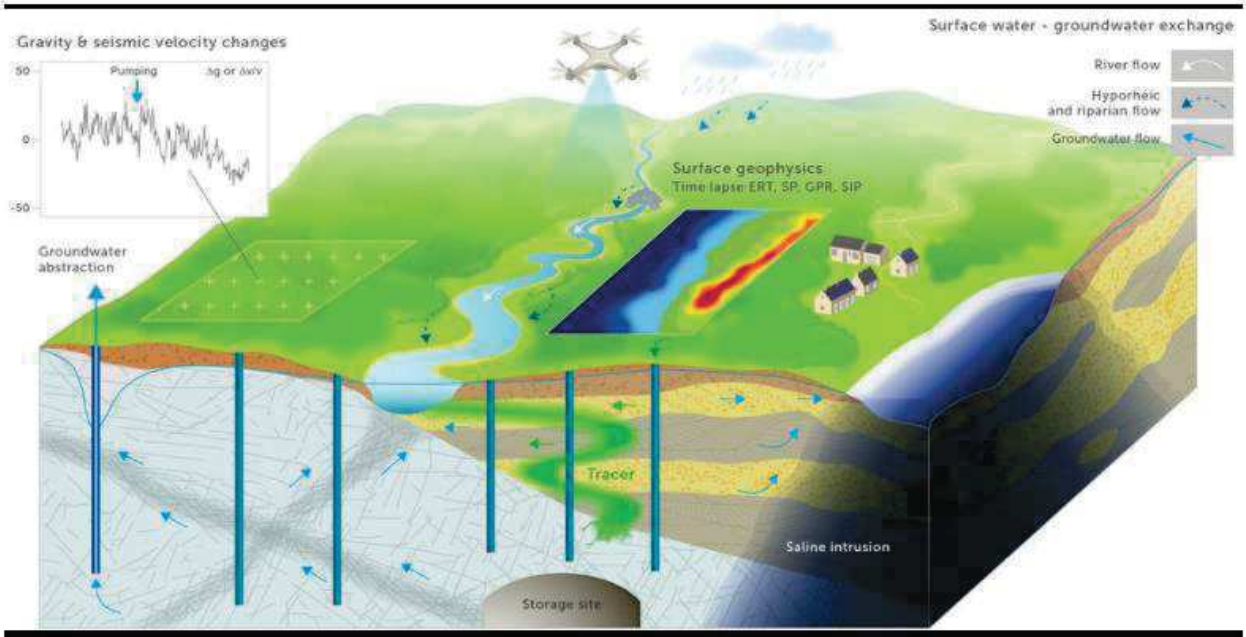
ENIGMA ITN



Home Network Research Training Project Overview Job opportunities Contact

PhD 1: Mixing and chemical reaction hotspots in saline-freshwater mixing zones

Mixing and chemical reaction hotspots in saline-freshwater mixing zones

The Institute of Environmental Assessment and Water Research (IDAEA-CSIC) is offering a PhD scholarship on the topic "Mixing and chemical reaction hotspots in saline-freshwater mixing zones" starting preferably before December 1, 2017. The project is funded by the Marie-Sklodowska-Curie Innovative Training Network "ENIGMA – EU Training Network for In situ imaGing of dynaMic processes in heterogeneous subsurfAce environments" within the Horizon 2020 Programme of the European Commission. ENIGMA is a consortium of high profile universities, research institutions and companies located in France, Spain, Germany, Switzerland, Belgium, Denmark, Sweden, USA and UK, and will train 15 PhD students in total (Early Stage Researcher, ESR). This particular PhD (ESR PhD 1) will be based at Barcelona at the Institute of Environmental Assessment and Water Research (IDAEA-CSIC) with research stays at CNRS/University of Rennes (France) and University of Lausanne (Switzerland). More information can be found on the ENIGMA web-site https://enigma-itn.eu.

In order to be eligible, each applicant must fulfill the following criteria at the time of recruitment:

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Page 2/4

- **Mobility:** At the time of recruitment, the applicant must not have resided or carried out his/her main activity (work, studies, etc...) in the country of the host organization for more than 12 months in the 3 years immediately prior to his/her recruitment.

Compulsory national service and/or short stays such as holidays are not taken into account.

- **Qualifications and research experience**: The applicant must fulfill the requirements defined for Early Stage Researchers (ESRs): ESRs are researchers who, at the time of recruitment, have **NOT yet been awarded the doctorate degree** and are in the first 4 years (full-time equivalent) of his/her research career.

Project description

Mixing across the SW-FW (saltwater freshwater) interface has been the subject of long debate, as it affects karst development, exchange reactions (including mobilization of Radium, used for quantifying nutrients fluxes into the ocean), and biochemical processes. Our conjecture is that mixing is hindered by stable salinity but enhanced by sea level fluctuations, and seasonal variations of temperature and inland recharge. Monitoring these, coupled to field experiments and numerical modeling, should provide new insights into mixing and freshwater displacement in coastal aquifers and subsequent geochemical reactions. This ESR will collaborate with ESRs 9 and 12 on the development and use of novel techniques for the characterization of transport and flow heterogeneity as well as reaction monitoring, which will feed into new theoretical approaches for the identification of mixing and reaction hotspots (see detailed description on the ENIGMA web-site https://enigma-itn.eu). These approaches are based on (i) quantification of flow heterogeneity and fluid deformation, (ii) identification of flow strain and stress centers, which drive concentration gradients and mixing, (iii) the development of mixing and reaction diagnostics to explain and predict observed reaction patterns.

Principal supervisor is Marco Dentz, CSIC Barcelona, E-mail: marco.dentz(at)idaea.csic.es

Job description

The position is available for a 3-year period and the key tasks as a PhD student are:

- To manage and carry through your research project
- To attend PhD courses
- To write scientific articles and your PhD thesis
- To teach and disseminate your research
- To stay at an external research institution for a few months, preferably abroad
- To be involved in departmental and group activities

ITN Enigma

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

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Formal requirements

Applicants should hold an MSc degree (or equivalent) with good grades and good English skills. As criteria for the assessment of your qualifications, emphasis will also be laid on relevant work experience and previous publications (if any).

Background of successful candidate

We invite candidates from different scientific fields to apply; geophysics, hydrology, hydrogeology, hydrogeophysics, environmental physics, soil physics, civil engineering, hydrogeochemistry or a related discipline. The candidate should have a solid background in mathematical analysis, modeling of hydrological processes and handling of large data sets. Furthermore, the candidate must have excellent personal skills and be able to work in a team. Experience with field work is desirable.s

Terms of Employment

The successful candidates will receive an attractive salary in accordance with the MSCA regulations for early stage researchers. The exact salary will be confirmed upon appointment and is dependent on the country correction factor (to allow for the difference in cost of living in different EU Member States). The salary includes a living allowance, a mobility allowance and a family allowance (if married). The guaranteed PhD funding is for 36 months (i.e. EC funding, additional funding is possible, depending on local supervisor).

For instance, for the ESR in France the grant available is :

41 425,20€ + 7,200€ (for mobility allowance) + €6,000 (for family allowance, if eligible); this is before any applicable tax and/or deductions for the employer and for the ESR.

Application Procedure

The application, in English, must be submitted electronically to marco.dentz(at)idaea.csic.es and must include the following:

- Cover Letter, stating your motivation and background for applying for the specific PhD project.
- CV, including list of publications (journal articles, master's thesis)
- Diploma and transcripts of records (BSc and MSc)
- References

CISC Barcelona wishes the staff to reflect the diversity of society and thus welcomes applications from all qualified candidates regardless of personal background.

ITN Enigma

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

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Questions

For specific information about the PhD scholarship, please contact the principal supervisor.

Contact

Marco Dentz
E-mail: marco.dentz(at)idaea.csic.es

Info

Application deadline: until position is filled

Start date: latest 01/12/2017

Department/Location: IDAEA-CSIC Barcelona (www.idaea.csic.es, www.mhetscale.wordpress.com)

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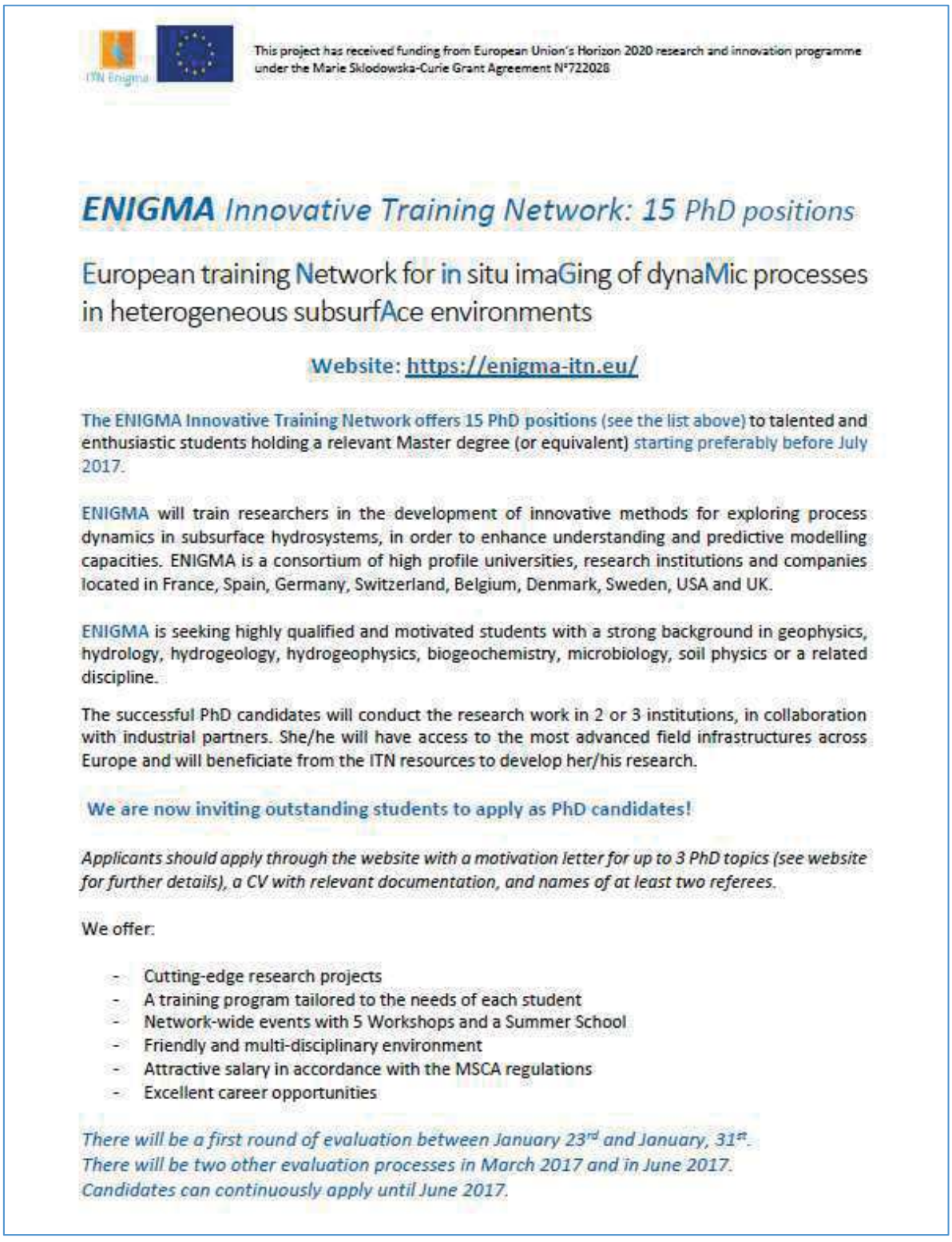
Proudly powered by WordPress.

2. Print screen example for one global ad, this one was published on the Earthworks Job website

Every PhD-ESR title redirected to the detailed webpage on the Enigma website.

Page 1/2:



This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028

ENIGMA *Innovative Training Network: 15 PhD positions*

European training Network for in situ imaGing of dynaMic processes in heterogeneous subsurfAce environments

Website: https://enigma-itn.eu/

The ENIGMA Innovative Training Network offers 15 PhD positions (see the list above) to talented and enthusiastic students holding a relevant Master degree (or equivalent) starting preferably before July 2017.

ENIGMA will train researchers in the development of innovative methods for exploring process dynamics in subsurface hydrosystems, in order to enhance understanding and predictive modelling capacities. ENIGMA is a consortium of high profile universities, research institutions and companies located in France, Spain, Germany, Switzerland, Belgium, Denmark, Sweden, USA and UK.

ENIGMA is seeking highly qualified and motivated students with a strong background in geophysics, hydrology, hydrogeology, hydrogeophysics, biogeochemistry, microbiology, soil physics or a related discipline.

The successful PhD candidates will conduct the research work in 2 or 3 institutions, in collaboration with industrial partners. She/he will have access to the most advanced field infrastructures across Europe and will beneficiate from the ITN resources to develop her/his research.

We are now inviting outstanding students to apply as PhD candidates!

Applicants should apply through the website with a motivation letter for up to 3 PhD topics (see website for further details), a CV with relevant documentation, and names of at least two referees.

We offer:

- Cutting-edge research projects
- A training program tailored to the needs of each student
- Network-wide events with 5 Workshops and a Summer School
- Friendly and multi-disciplinary environment
- Attractive salary in accordance with the MSCA regulations
- Excellent career opportunities

There will be a first round of evaluation between January 23rd and January, 31st.
There will be two other evaluation processes in March 2017 and in June 2017.
Candidates can continuously apply until June 2017.

Page 2/2:

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028

ESR1-PhD: **Mixing and chemical reaction hotspots in saline-freshwater mixing zones**
Supervisor: Marco Dentz, Jesus Carrera, CSIC Barcelona (CNRS Rennes, UNIL Lausanne, ACA Barcelona)[1]

ESR2-PhD: **Imaging flow dynamics and reactivity in the stream-aquifer transition zone**
Supervisor: Jan Fleckenstein, UFZ Leipzig (UCPH Copenhagen, UNINE Neuchâtel)[1]

ESR3-PhD: **Closing the observational gap between the hyporheic and meander scale**
Supervisor: Philip Brunner, UNINE Neuchâtel (UFZ Leipzig, GEOTH Heiligenstadt)[1]

ESR4-PhD: **Flow and transport in fracture networks: reducing uncertainty of DFN models by conditioning to geology and geophysical data**
Supervisor: Caroline Darcel, ITASCA, Philippe Davy, CNRS Rennes, (UNIL Lausanne, SKB Sweden)[1]

ESR5-PhD: **Monitoring spatio-temporal water redistribution in the subsurface with seismic methods**
Supervisor: Laurent Longuevergne, CNRS Rennes, Ludovic Bodet, UPMC Paris (UNIL Lausanne, SKB Sweden)[1]

ESR6-PhD: **Active Fiber-Optic DTS methods to monitor subsurface flow dynamics**
Supervisor: Olivier Bour, CNRS Rennes (CSIC Barcelona, OSU Oregon, SILIXA)[1]

ESR7-PhD: **Multi-scale thermal imaging of groundwater upwelling in stream valleys**
Supervisor: Peter Engesgaard, UCPH Copenhagen (UNINE Neuchâtel, UFZ Leipzig)[1]

ESR8-PhD: **Monitoring water storage changes with a new portable absolute quantum gravimeter**
Supervisor: Bruno Desruelle, µQuanS, Cédric Champollion, UM Montpellier (UCPH Copenhagen)[1]

ESR9-PhD: **Geophysical signatures of spreading and mixing**
Supervisor: Niklas Linde, UNIL Lausanne (CNRS Rennes, CSIC Barcelona)[1]

ESR10-PhD: **High-resolution imaging of transport processes with GPR full-waveform inversion**
Supervisor: Jan van der Kruk, FZ Jülich (CNRS Rennes, UNIL Lausanne)[1]

ESR11-PhD: **Joint heat and solute tracer test inversion for imaging preferential pathways**
Supervisor: Alain Dassargues, ULG Liège (BRGM Orléans, FZ Jülich)[1]

ESR12-PhD: **Spectral induced polarization monitoring to quantify biochemical reactions**
Supervisor: Sander Huisman, FZ Jülich (CNRS Rennes)[1]

ESR13-PhD: **Fully coupled hydrogeophysical inversion of 3D tracer tomography**
Supervisor: Olaf A. Cirpka, UT Tübingen (ULG Liège)[1]

ESR14-PhD: **Geologically constrained joint inversion of hydraulic, tracer and ERT data for process visualization**
Supervisor: Jesus Carrera, CSIC Barcelona (UCPH Copenhagen, ACA Barcelona)[1]

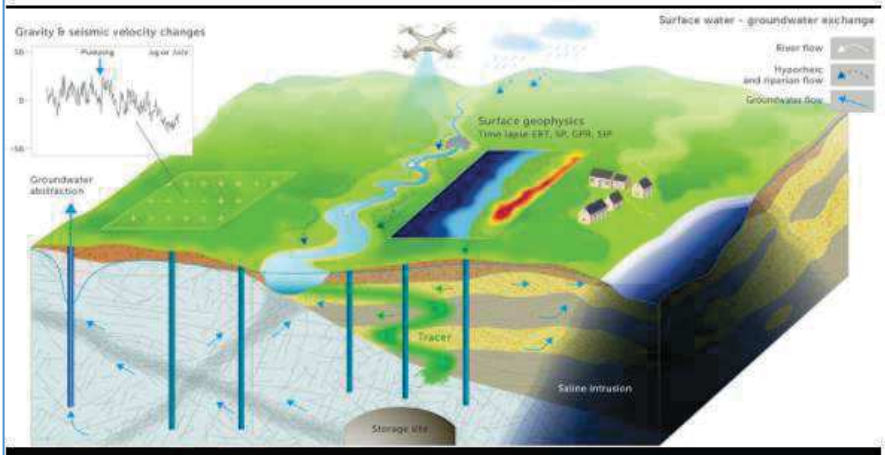
ESR15-PhD: **Integration of dynamical hydrogeophysical data in a multiple-point geostatistical framework.**
Supervisor: Frédéric Nguyen, ULG Liège (CSIC Barcelona, AQUA Montpellier)[1]

[1] Candidates will devote time to learn methods and/or do field work at co-supervising centers, in parenthesis.

Enigma Application Form on the Enigma website

(Print screen taken before the last round)

ENIGMA ITN



Home | Network | Research | Training | Project Overview | Job opportunities | Contact

Private: ENIGMA Recruitment form

The applicants can apply for one to maximum three positions. They should rank the PhD positions by order of preference.
All PhDs shall preferably start in June 2017 but the candidates should apply as soon as possible.
There will be a round of evaluation between June 25th 2017 and July 7th 2017.

Candidates can continuously apply until June 2017.
*All uploaded files should be pdf files (< 10 Mo) and fields marked with * must be filled in.*

Positions

* **Position 1:** --
Position 2: --
Position 3: --

Candidate

* **Civility:** --
* **Name:** * **Surname:**
Email:
* **Nationality:**

* **Nationality:**
* **How did you find the information about this job offer? (journal, newsletter, personal contact):**
* **CV:** Choisissez un fichier Aucun fichier choisi
* **Motivation letter:** Choisissez un fichier Aucun fichier choisi

(1-2 pages in English, explaining the reasons for the candidate's interest in this ITN and particularly for the max 3 selected positions ranked by preference, the candidate's vision for the projects and the scientific objectives, and their most relevant skills or experiences. They should also indicate the names and contact details of referees)

Academic credentials

Academic credentials (mark sheets and degree statements)

MSc Mark sheets: Choisissez un fichier Aucun fichier choisi
Degree statements (MSc): Choisissez un fichier Aucun fichier choisi

Valider

Edit

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Nationality

- The applicants came from 81 different countries. (See more details in Annex 1)

Gender

First round:

157 applicants. Deadline: January 23rd, 2017

• 19 % of male candidates were evaluated as A candidates

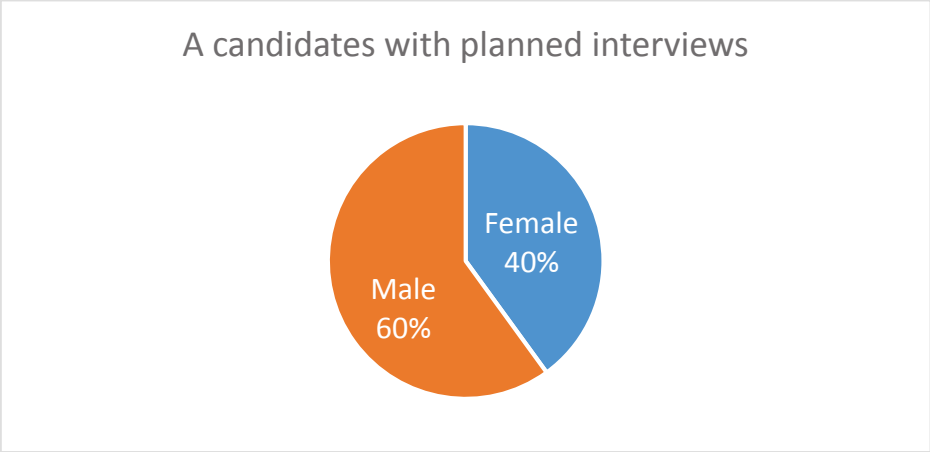
• 41 % of female candidates were evaluated as A candidates

Gender of the global pool of cpplicants:

	All candidates (evaluated on 12/02/2017)		
	Female	**Male**	**Total**
Number	**32**	**125**	**157**
%	20	80	100

Gender of A candidates who were selected for interviews:

	A candidates		
	Female	**Male**	**Total**
Number	10	15	25
%	40	60	100



There were 8 positions remaining after the first round.

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Second round:

256 applicants. Deadline: March 25th, 2017

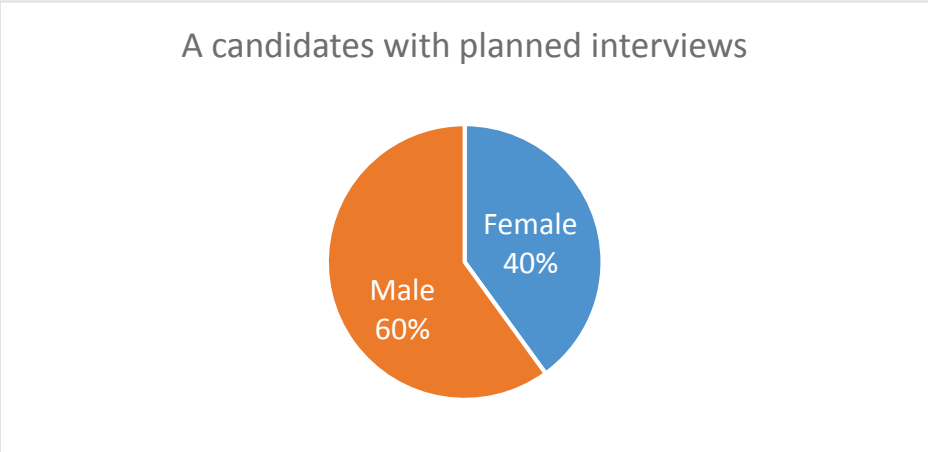
- 18 % of male candidates were evaluated as A candidates
- 30 % of female candidates were evaluated as A candidates

Gender of the global pool of applicants:

	All candidates (evaluated on 13/04/2017)			
	Female	Male	Not indicated	Total
Number	60	193	3	256
%	23	75	1	100

Gender of A candidates who were selected for interview

	A candidates		
	Female	Male	Total
Number	10	15	25
%	40	60	100



There was only one position remaining after the second round.

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Third round:

214 applicants. Deadline: July 7th, 2017

Gender of the global pool of applicants:

Female	43
Male	171

- 5 A candidates including 1 female candidate
- 2% of female candidates were evaluated as A candidates
- 2% of male candidates were evaluated as A candidates

An additional round was launched during September 2017 for the ESR1 Position

As one candidate: Sruthi Sathyadevan, for ESR1 informed the supervisors that she withdrew her application in September 2017. All the administrative procedures regarding contracting and visa application were stopped and the recruitment process for ESR1 was relaunched during September 2017.

About the withdrawal of Sruthi Sathyadevan:

She wrote to the concerned supervisor:

"I regret to inform you that I need to withdraw my application for the PhD position at CSIC. My thesis is getting delayed and it will take a few more months of work to finish it, as per talks with TU Delft and my supervisors. I will not be graduating until I do that, which will be towards the end of the year at most. I sincerely regret this took time to inform but I only recently learnt this myself. "

The supervisor offered her to talk via Skype about the possibilities to postpone the starting date until the end of the year (2017), to which she did not respond. Then she did not answer anymore to the emails.

The advertisements were published again on Euraxess, Earthjobs and via Newsletters and email campaigns.

There were 21 candidates (2 female, 19 male) from 12 countries (Abu Dhabi (1), Algeria (2), Bangladesh (1), Belgium (1), Brazil (1), China (4), Egypt (1), Germany (1), Iran (5), Italy (2), Mexico (1), and Pakistan (1)).

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Summary of the recruited ESRs (rounds 1 & 2 & 3):

		Surname Name	Position	Start	Nationality	How did you find information about this ITN?
1	Mr	Richard Hoffmann	ESR11	01/05/2017	German	Newsletter of "Praxisinitiative Aachener Geowissenschaftler"
2	Ms	Veronika Rieckh	ESR13	01/07/2017	Austrian	Mailing list
3	Mr	Guillerme Nogueira	ESR02	01/10/2017	Brazilian	Personal contact
4	Mr	Joel Tirado Conde	ESR07	01/05/2017	Spanish	Copenhagen portal
5	Mr	Jorge Lopez Alvis	ESR15	01/06/2017	Mexican	Newsletter
6	Mr	Alejandro Fernandez Visentini	ESR09	01/09/2017	Argentinean/Spanish	Personal contact
7	Mr	Satoshi Izumoto	ESR12	01/07/2017	Japanese	Personal contact
8	Mr	Peleg Haruzi	ESR10	01/08/2017	Israeli	http://www.earthworks-jobs.com
9	Ms	Justine Molron	ESR04	Between 28/08/2017 and 01/09/2017	Belgian	Linkedin (F. Nguyen)
10	Ms	Lara Blazevic	ESR05	01/09/2017	Croatian,_Venezuelan	http://www.earthworks-jobs.com
11	Ms	Anne-Karin Cooke	ESR08	28/08/2017	German/British	AGU_Website
~~12~~	~~Ms~~	~~Sruthi Sathyadevan~~	~~ESR01~~	~~September 2017~~	~~Indian~~	~~?~~
13	Ms	Andrea Palacios	ESR14	01/09/2017	Venezuelian	http://www.earthworks-jobs.com
14	Mr	Álvaro Pardo Álvarez	ESR3	September 2017	Spanish	Personal contact
15	Mr	Behzad Pouladi	ESR6	December, 01st 2017	Irani	http://www.geo.uu.nl/hydrogeology/vacancies.html
	Mr	de Vriendt, Kevin	ESR01	December 2017	Belgium	Advertisement at Uni Goettingen

Table 3: List of the recruited ESRs

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

In conclusion:

- ***Six female ESR (40%) and nine male ESR (60%) were recruited before the departure of Sruthi Sathyadevan***

- **Finally with the recruitment of Kevin de Vriendt, there are:**
  Five female ESR (33.3%) and ten male ESR (66.7%) recruited

- **13 ESR started their PhDs before October 2017.**

Kevin de Vriendt started ESR1-PhD in December 2017.

After some visa issues, finally Behzad Pouladi started ESR6-PhD in December 2017.

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

ANNEXES

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Annex 1: Nationalities of the applicants

Albanian	1
Algerian	12
American	1
Argentinean/Spanish	1
Argentinian/Italian	3
Austrian	7
Azerbaijan	3
Bangladeshi	15
Belgian	2
Bhutan	1
Bolivian	2
Brazilian	6
British	2
Bulgaria	1
Cambodia	2
Cameroonian	6
Canadian	1
chilean	1
Chinese	12
Colombian	7
Croatian	3
Croatian,_Venezuelan	1
Cuban	1
Ecuadorian	3
Egyptian	14
Ethiopian	22
Fijian	1
Finn	1
French	10
Gabonese	1
Georgia	1
german	14
German,_British	1
Ghanaian	23
Greek	6
Hungarian	4
Indian	73
Indonesian	6
Iranian	98
Iraqi	1
Irish	1
Israeli	2
Italian	30
Ivorian	2
japan	1
Jordanian	2
Kenyan	2
Lebanese	5
mexican	1
Mongolian	1
Moroccan	10
Namibian	1
Nepalese	3
Netherlands	1
New_Zealand	2
Nigerian	33
Norwegian	1
Pakistani	35
Palestinian	5
Peruvian	4
Philippines	1
Polish	3
Portugal	1
Russian	7
Rwandan	1
senegalese	1
Serbian	3
South_Korea	1
Spanish	15
Sri_Lankan	8
Sudanese	3
Syria	1
Tanzanian	2
Thai	1
Tunisian	7
Turkey	9
Ugandan	3
Ukraine	3
Venezuelan	4
Vietnamese	3
Zimbabwean_	1

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Annex 2:

Shortlisted candidates for round 1:

ID (on the common shared file)	Gender	First name	Family name	Nationality	Interviews (1-3)		
17	Male	Jorge	Lopez-Alvis	Mexican	ESR15	ESR10	ESR12
30	Male	Richard	Hoffmann	German	ESR11		
31	Male	Allesandro	Salusti	Italian	ESR10		
41	Male	Nikolaos	Apeiranthitis	Greek	ESR4		
49	Male	Kenneth	Muhumuza	Ugandan	ESR5		
54	Male	Oscar	Jimenez-Fernandez	Spanish	ESR2		
61	Male	Davi	Rodriguez-Damasceno	Brazil	ESR15		
68	Female	Banfsheh	Najjarifarizhendi	Iranian	ESR5		
78	Male	Marco	Marin	Italian	ESR2	ESR10	ESR13
92	Male	Jonas	Garcia-Rincon	Spanish	ESR11		
99	Female	Zsofia	Kiraly	Hungarian	ESR2		
103	Male	Alejandro	Fernandez-Visentini	Argentinian/Spanish	ESR9	ESR10	
104	Male	Matteo	Scamponi	Italian	ESR10		
106	Male	Karol	Skarupa	Polish	ESR4		
108	Male	Satoshi	Izumoto	Japanese	ESR9	ESR12	
113	Female	Yulia	Gruzdeva	Russian	ESR4		
114	Male	Guilherme	Nogueira	Brazilian	ESR2		
140	Female	Veronika	Rieckh	German	ESR13		
141	Female	Ahou Nelly	Konan	Ivorian	ESR15		
149	Female	Mitra	Asadollahi	Netherlands	ESR4	ESR13	
1001	Female	Gurcan	Tugba	Turkey	ESR7		
1002	Female	Francesca	Parnanzone	Italian	ESR7		
1003	Female	Irene	Tonelato	Italian	ESR7		
1004	Male	Joel	Tirado_Conde	Spanish	ESR7		
1005	Female	Maryam	Karbalaei	Iranian	ESR7		

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Annex 3:

To give an overview of the process, here is an extract of the common shared file used to evaluate the applications with the candidates for the round 1 *(the complete file also had columns with the CV, Motivation Letter, email address, Marks sheets and degrees, etc…)* :

N°	Nationality	Gender	Name	Surname	Position 1	Position 2	Position 3	*Evaluation*	*Each ESR responsible indicates A/B/C candidates for ENIGMA (not only for specific ESR)*	*ENIGMA contact (will manage this application)*
1	Iraqi	male	Hadi_Hama_aziz_Muhammed	Muhammed	ESR8	ESR7	ESR2	No geophysical background / good soil physic knowledge /	B-	C. Champollion
2	Colombian	no sent documents	Julian_David	Realpe_Campaña	ESR9	ESR4	ESR11	no sent documents	no sent documents	N. Linde
3	Zimbabwean_	male	Brighton_	Munyai_	ESR4	ESR4	ESR14	Background in hydrogeology only, and a carrier in the industry.	C	P. Davy/C. Darcel
4	Iranian	male	Mohammadreza	Azimi	ESR4	ESR1	ESR11	26. Background in mechanical engineering. 35 publications on diferent fields of mech.eng. The motivation letter does not tell anything about hydro or geophysics; not really convincing	A	P. Davy/C. Darcel

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

5	Egyptian	male	Diaa_Elsayed	Hamed	ESR13	ESR10	ESR2	geopyhsical background (MSc) only in archaeogeophysics, unclear background in hydreogeology	C	C.Leven
6	Israeli	male	Idit	Belachsen	ESR7	ESR5	ESR2	Potetially a good candidate. But has not applied threw the official KU site and we cannot hire him. Expresses interest in combining modelling and remote sensed data.	A	Majken Caroline Looms Zibar
7	Chinese	female	Qiuyun	Yang	ESR1	ESR12	ESR5	Potentially good. Chemical engineer. Hard to tell. May be interview	A?	J. Carrera
8	Rwandan	female	Niyotwambaza_Hitimana	Christine	ESR1	ESR9	ESR12	Good in water management, but not really outstanding	B	J. Carrera
9	Pakistani	male	Muhammad_Arslan	Ahmad	ESR11	ESR14	ESR13	Potentially a good candidate but with a focus on soil science	B	F. Nguyen
10	Palestini	male	Mahmoud	Zaid_	ESR14	ESR1	ESR9		C	J. Carrera
11	Ghanaian		Bernard	Ayumu	ESR1	ESR8	--	Good GW, but not outstanding	B	J. Carrera
12	Pakistani	male	Khan	Muhammad_Younis	ESR9	ESR10	ESR15	M.Phil in 2011 and doing research since, so not an ESR. Not eligible.	C	N. Linde

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

13	Ethiopian		Hadush	Meresa	ESR8	ESR13	ESR2	B or C candidate	C	C. Champollion
14	French	male	BEKKAL	Norine	ESR9	ESR4	ESR5	B+ candidate	B+	N. Linde
15	Italian	male	Fiorenzo	Pascale	ESR4	ESR5	ESR15	33a. Background in geology. MsC in 2010 with more than 3 years of research since	B	C.Darcel/P.Davy
16	Mongolian	male	Zoljargal	Dorjnyamaa	ESR6	ESR7	ESR2	B or C candidate	C	O. Bour
17	mexican	male	Jorge	Lopez-Alvis	ESR15	ESR10	ESR12	A Hydrogeology with good background in geophysics. Exchange with UCal and programming skills	A	F. Nguyen
18	Croatia	male	Nikola	Motik	ESR9	ESR15	ESR5	B candidate	B	N. Linde
19	Nigerian		Umar	Abdullahi	ESR4	ESR6	ESR2	C candidate (poor rating at the NTNU)	C	C. Darcel/P. Davy
20	Nigerian		Jimoh	Rafiu_Atanda	ESR1	ESR4	ESR14	Works currenlty as consultant, experience in GIS, hydroinformatics, not suited for ESR1	B	M.Dentz
21	Iranian	male	Bahram	Yousefi	ESR13	ESR9	ESR15	mainly focus on geophysics from geotechnical applications (road construction, material testing etc), no background in hydrogeology	C	CarstenLEVEN

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

22	Colombian	male	Julian_David	Realpe_Campaña	ESR9	ESR4	ESR11	A- candidate	A-	N.Linde C.Darcel/P.Davy
23	Ghanaian	male	Joshua	Lartey	ESR10	ESR9	ESR4	Mathematical background. Reasonable grades. Currently specialzing in Geophysics.	B	S.Huisman
24	Egyptian		Muinr	El-Mahdy	ESR4	ESR7	ESR9	30y, Background in structural geology.	B	C.Darcel/P.Davy
25	iranian		mahshid	shekarrizfard	ESR1	ESR2	ESR4	Degree in environmental engineering, currenlty working as consultant, experience in field investigation. Not suited for ESR1	B	M.Dentz

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Annex 4:

Shortlisted candidates for round 2:

(In grey: positions already filled in during round 1)

N°	Gender	Name	Surname	Position 1	Position 2	Position 3	*ENIGMA contact (will manage this application)*	*Evaluation*	*Each ESR responsible indicates A/B/C candidates for ENIGMA (not only for specific ESR)*
176	Sir	Masoud	Jafari_Shalamzari	ESR14	ESR7	ESR8	J.Carrera	very Good, but not sufficient	A
217	Sir	Jonathan	Ford	ESR5	ESR10	ESR15	L.Longuevergne/ L.Bodet	A : MSc 2014, good marks + experience in industry (seismic), quite appropriate background/	A
247	Sir	Guillermo	Giacomi	ESR14	ESR5	ESR8	J.Carrera	Good background, although he does not provide much info	A
249	Madam	Luisa	Bienstein	ESR5	--	--	L.Longuevergne/ L.Bodet	MSc 2016, medium marks, interesting background applied geophysics/	A
252	Sir	Tim-Julian	Hupe	ESR4	--	--	C.Darcel/P.Davy	good candidate	A
256	Sir	Guillermo	Giacomi	ESR14	ESR5	ESR8	J.Carrera	Good background, although he does not provide much info	A
264	Madam	Jingjing	Wang	ESR15	ESR14	ESR13	J.Carrera	Excellent Geoph, math and prog	A
267	Sir	Lijiao	Zhang	ESR10	ESR5	ESR9	S.Huisman	Interesting backgound	A
270	Madam	Lara_Antonia	Blazevic_Vucelic	ESR5	ESR9	ESR4	L.Longuevergne/ L.Bodet	Appropriate background/rock physics	A

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

297	Sir	Christian	Pflugl	ESR3	ESR6	ESR7	P.Brunner	well qualified--quite close to my topic	A
304	Madam	Mader	Sarah_Melanie	ESR5	--	--	L.Longuevergne/ L.Bodet	Interesting but weak motivation letter	A
306	Sir	Alvaro	Pardo_Alvarez	ESR3	--	--	P.Brunner	interesting candidate, despite limited experience in numerical modelling	A
313	Madam	Molron	Justine	ESR7	ESR9	ESR4	C.Darcel/P.Davy	Background in geophysics. Professional experience in Aquale.	A
344	Madam	Anne-Karin	Cooke	ESR8	ESR1	--	C.Champollion	Very interesting letter.	A
348	Sir	Behzad	Pouladi_Borj	ESR6	--	--	O.Bour	M SC in 2015, very good background in Reservoir enginnring (less in hydrology), very good experience in oil reservoir monitoring, good grades, already 5 papers on WOS (one if first author)	A
349	Sir	Mehrdad	Ghorbani_Mooselu	ESR3	--	--	P.Brunner	good background fro the project--well crafted letter.	A
357	Madam	Juliana	Garrido_Damaceno	ESR8	ESR9	ESR4	C.Champollion	good candidate	A
376	Madam	ANDREA	PALACIOS	ESR14	ESR9	--	J.Carrera	Excellent from all points of view	A

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377	Sir	Pengyong	Miao	ESR6	--	--	O.Bour	M SC in 2017 in geology (?), has strong experience with FO sensing applied to civil engineering or geology, intresting background, need to know more about his skills	A
378	Madam	Sruthi	Sathyadevan	ESR1	--	--	M.Dentz		A
387	Sir	Sefa	Sahin	ESR3	--	--	P.Brunner	very good match with ESR 3. good background.	A
388	Sir	Harmandeep_Singh	Matharu	ESR1	ESR3	ESR4	M.Dentz		A
395	Sir	Ehsan	Pasha	ESR3	--	--	P. Brunner	strong background, excellent references, not clear if his master thesis is already finished	A
400	Sir	Peleg	Haruzi	ESR10	--	--	S.Huisman		A
404	Madam	Rebecca	Bruni	ESR10	ESR5	--	S.Huisman	Interesting	A

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Annex 5:

Shortlisted candidates for round 3:

(In grey: positions already filled during previous rounds)

N°	Nationality	Gender	Name	Surname	Position 1	Position 2	Position 3	ENIGMA contact (will manage this application)	Each ESR responsible indicates A/B/C candidates for ENIGMA (not only for specific ESR)
573	Iranian	Madam	seyedeh_Robab	Moosavi	ESR6	ESR14	--	O.Bour	A
603	Lebanese	Sir	Abdallah	Najdi	ESR6	ESR6	ESR3	O.Bour	A
613	Canadian	Sir	James	Johnson	ESR6	--	--	O.Bour	A
620	German	Sir	Daniel	Nasemann	ESR6	--	--	O.Bour	A
630	Swiss	Sir	Enea	Toschini	ESR6			O.Bour	A

Actually, some A candidates from the previous rounds were also considered again during this last round.

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End of the deliverable: D7.3 / D27
Completion of the Recruitment Process- Report

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Enigma ITN

End of Annex 2

Annex 3

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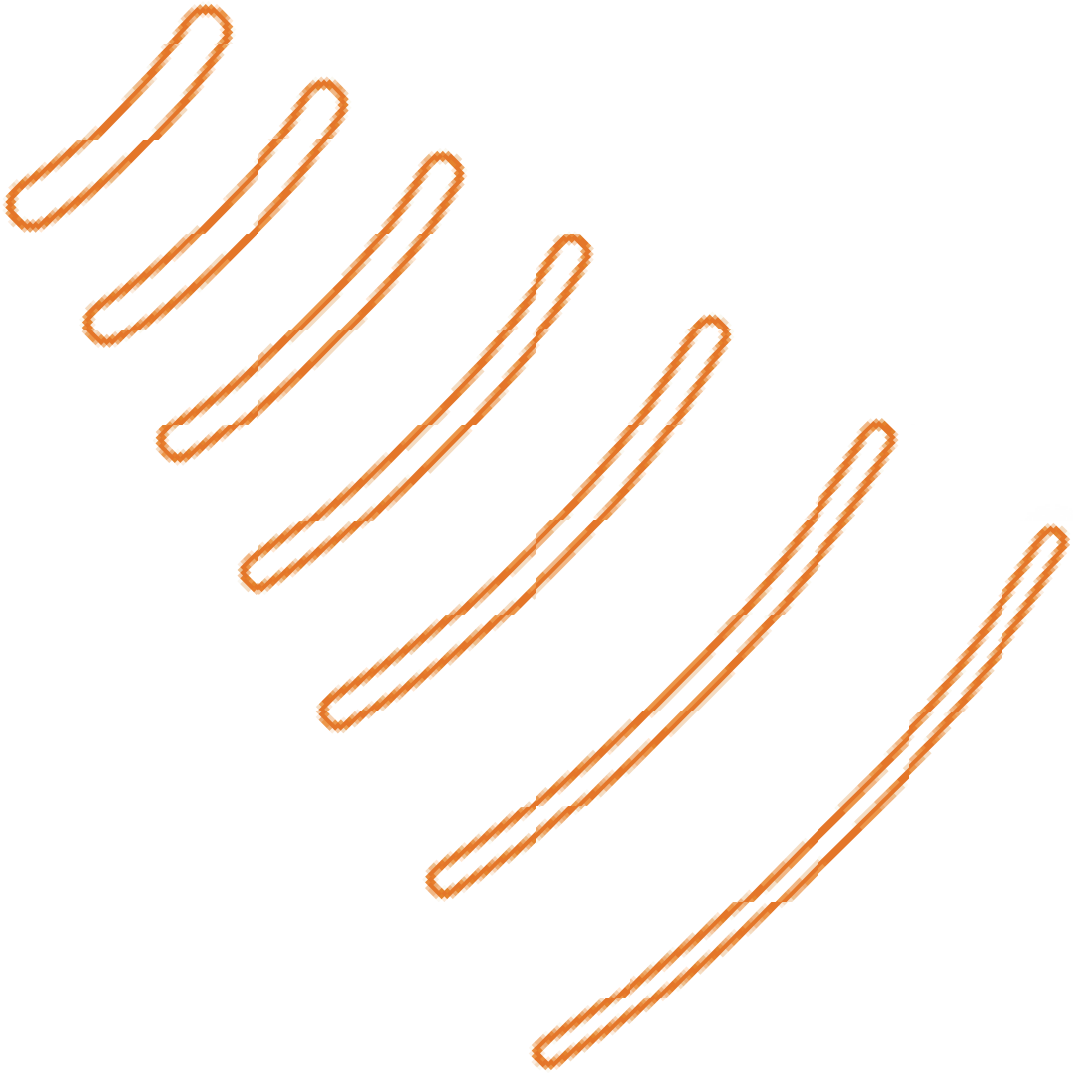

Summary report

Minute of Progress Meeting – Deliverable D7.9

ENIGMA Selection Committee

ENIGMA/GA 722028

Skype meeting – 07/12/2016

Summary

Participants 3
Discussion about proposed recruitment procedure 3
Discussion about general draft for the global advertisement 4
Discussion about the website 4
Results for the vote for the logo 4
Conclusions 4

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Participants

Selection Committee	
Philippe Davy	Project Coordinator
Olivier Bour	1. CNRS Rennes
Damien Jougnot	CNRS Paris
Jesus Carrera	2. CSIC Barcelona
J.A (Sander) Huisman	3. Forschungszentrum Jülich, Agrosphere Institute IBG-3
Jan Fleckenstein	4. Helmholtz Centre for Environmental Research
Frederic Nguyen	5. University of Liège
Carsten Leven-Pfister **(not available)**	6. University of Tübingen
Majken C. Looms	7. University of Copenhagen
Niklas Linde	8. University of Lausanne
Philip Brunner	9. Neuchâtel University
Cédric Champollion	University of Montpellier
Caroline Darcel	11. Itasca Consultants S.A.S.
Athena Chalari	SILIXA

Discussion about proposed recruitment procedure

No specific requirement for the English level => this will be evaluated in the requested documents:

- Motivation letter (why a PhD, why they should be part or this specific ITN, choices & preferences)
- CV
- 2 Referees
- Transcript of degree & courses (Master Level)

Candidates should always apply on the website & not just only privately.

They will indicate 3 preferences max & would be dealt by the supervisors.

There is a need to prepare for the technical structure for the applications & a common document (Google File) to comment the applications => everything should be ready before Christmas.

There will be some time during the KOM in Paris for the Selection Committee (SC) discussions.

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Discussion about general draft for the global advertisement

There must be a Flyer ready for the AGU with the list of the projects and information about the website.

The dates for the deadlines are :

January 23th, March 25th 2017 and June 25th 2017 to prepare discussion by the selection committee on respectively January 31st, March 30th 2017 and July 7th 2017.

Candidates can apply continuously until June 2017.

All PhD start together in June 2017.

Discussion about the website

M-Françoise Gerard reminds the partners about (they should send the necessary information) :

- Pages to describe the partners
- Pages for the job offers

Way to apply ?

⇨ We will use a Recruitment Form on the website.

Results for the vote for the logo

The selected logo is the n°2.

Conclusions

M-Françoise Gerard will send to the SC :

- A list of things to do for the SC before end of the week
- A draft for the flyer
- A draft for the journals

She will supervise the creation of the website before Christmas and find the information about the salary (rules /average…)

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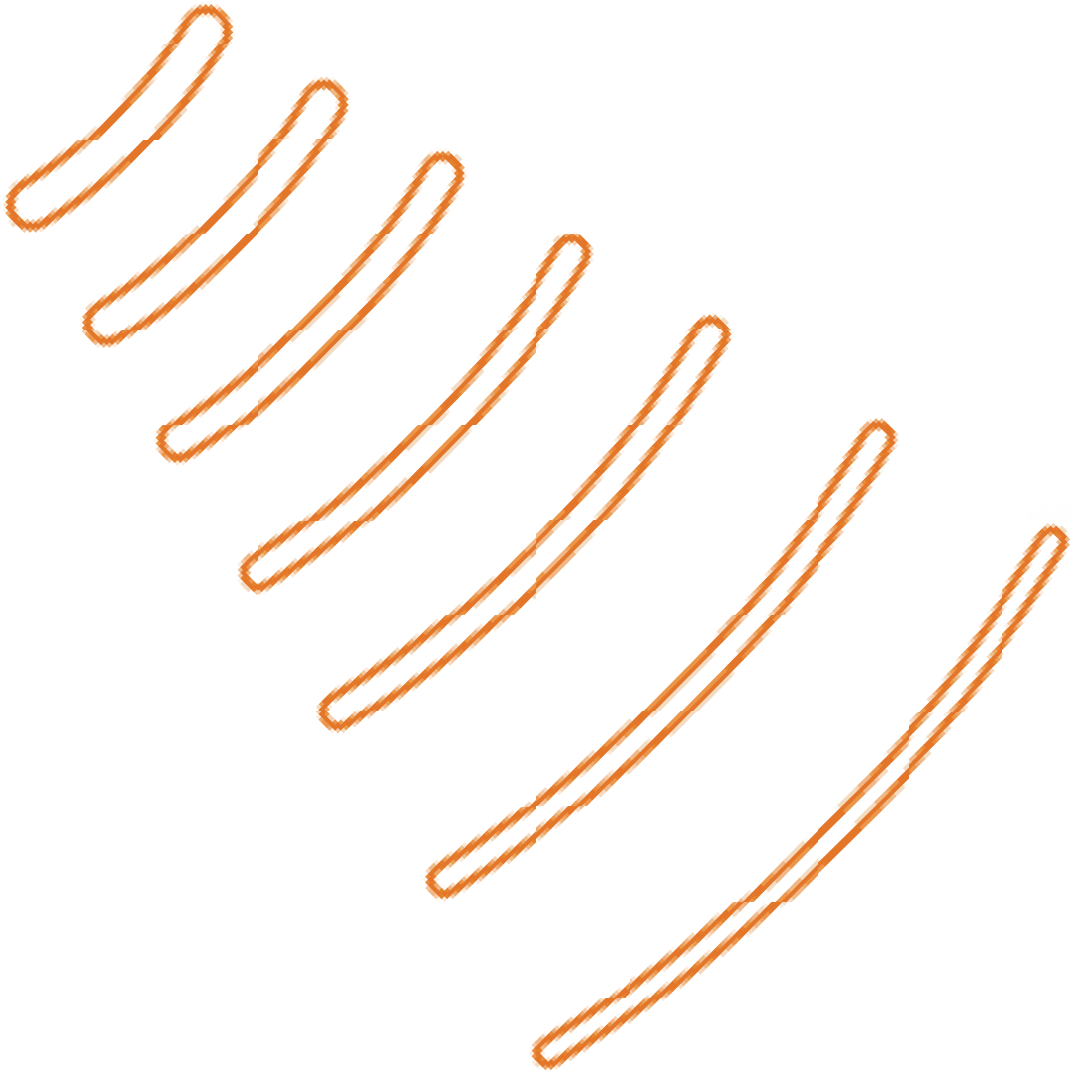
Enigma ITN



Summary report

Minute of Progress Meeting – Deliverable D7.9

ENIGMA Kick-Off Meeting n° 1

ENIGMA/GA 722028

PARIS 30 & 31/01/2017

Summary

Participants 3

Monday 30/01/2017 4

Introduction & practical information by D. Jougnot. 4

How the idea of ENIGMA was born. 4

General presentation. 4

Presentation of each ESR. 4

4 separate meetings for the Workpackages. 4

Five things, which were discussed: 4

The deliverables (organize/manage to do them) 4

WP1: Sander Huisman. 4

WP2: Karsten Jensen. 5

WP3/ Niklas Linde. 5

WP4: Olaf A. Cirpka. 6

WP5 Training. 6

Tuesday 31/01/2017. 7

Management, administrative & financial issues – Lydia Brunault, DR17. 7

Several boards : 7

Selection Committee. 8

Constitution of committees 11

Supervisory Board : All infrastructure supervisors & a representative of each of the partners, to validate all the decisions, solve conflicts. 11

Database : 12

1. Tereno : local databases communicating with one common portal. 12
2. Hobe: 12
3. H+ Database. 12

Discussion of the Experimental IC. 13

Discussion of the TTC. 13

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Participants

Participant KOM	ESR (Beneficiary)	(invited or secondment : coordinator or concerned ESR)
Alexandre Boisson		BRM
Jan-Olof SELROOS		ESR4-ITASCA CNRS Rennes
Philip BRUNNER	ESR3-UNINE Neuchâtel	
Jesus CARRERA	ESR14-CSIC Barcelona	
Cédric CHAMPOLLION	ESR8-µQuans MMontpellier	
Bruno DESRUELLE	ESR8-µQuans MMontpellier	
Caroline DARCEL	ESR4-ITASCA CNRS Rennes	
Laurent LONGUEVERGNE	ESR5-CNRS Rennes	
Ludovic Bodet	-	-
Olivier BOUR	ESR6-CNRS Rennes	
Athena CHALARI		ESR6-CNRS Rennes
Olaf CIRPKA	ESR13-UT Tübingen	
Carsten LEVEN	ESR13-UT Tübingen	
Alain DASSARGUES	ESR11-ULG Liège	
Frederic NGUYEN	ESR15-ULG Liège	
Pascal GODERNIAUX	ESR15-ULG Liège	
Thomas Hermans	ESR15-ULG Liège	
Tanguy ROBERT		ESR15-ULG Liège
Maria Pool	ESR1-CSIC Barcelona	
Selker, John		
Lydia BRUNAULT		Délégation dr17
Philippe DAVY		Coordinateur CNRS
Marie-Françoise GERARD		Coordinateur CNRS
Damien JOUGNOT	-	-
Tanguy LE BORGNE		Coordinateur CNRS
Konstantinos Chalikakis		Coordinateur CNRS
Sander HUISMAN	ESR12-FZ Jülich	
Jan VAN DER KRUK	ESR12-FZ Jülich	
Karsten JENSEN	ESR7-UCPH Copenhagen	
Majken LOOMS	ESR7-UCPH Copenhagen	
Niklas LINDE	ESR9-UNIL Lausanne	
Nico TRAUTH	ESR2-UFZ Leipzig	
Ulrike WERBAN	ESR2-UFZ Leipzig	
Jan FLECKENSTEIN	ESR2-UFZ Leipzig	

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Monday 30/01/2017

Introduction & practical information by D. Jougnot

How the idea of ENIGMA was born

General presentation

Comments:

- Jan Fleckenstein: Will there be a mid-term evaluation? With a Project Officer guest / a requested report scientific or more?
- Lydia Brunault : The workpackages have been changed => the first one is now about Ethics, and so the others are X+1.

Presentation of each ESR

4 separate meetings for the Workpackages

Five things, which were discussed:

1. Scientific questions (main 2/3 questions/WP)
2. Why are the database needed? The way to store & share the data?
3. The outcomes expected for each WP

The deliverables (organize/manage to do them)

4. The relations between ESR & experimental site

⇨ Favor common work to do as a network

(Question P.Davy to Lydia : why only PhD positions => 3 years.)

WP1: Sander Huisman

Sander is not supposed to be in this WP but he accepted to lead the discussion.

This WP is more about understanding the processes. It is a workpackage, which concerns many other workpackages.
There are joined scientific interests (model complexity…) and the ESRS are internal => lot of potential to develop collaborations.

Data needs: there is a willingness to standardize & to manage them.

Question of a need of a common database or if all sites already have their own database, is it enough?

Niklas Linde: there will be collaborations with all WP, not only the indicated ones for the moment. WP should not be seen as internal work groups but all the ESRs could meet in all WP.

⇨ WP are just administrative units & little artificial.

SKB has a database. It is not available to everybody & it's huge/not user friendly.

Is there a need for a more open ENIGMA Database?

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Olaf A. Cirpka: One common database is not realistic => something more realistic is one portal to indicate how to access catasets. This would list things existing and how to access them. The accessibility primes on everything.

Jesus Carrera: not unique format ?

T.Le Borgne: one proposition could be each dataset in a ZIP with a pdf describing it in some repository servor.

WP2: Karsten Jensen

1. *How to deal with spatial & temporal heterogeneity in unsaturated and saturated zones?* Possibilities, complementarities, limitations of techniques
2. *Database needs :*
   Metadata requirements, other persons should be able to retrieve and understand data
   Standards for sharing ERT & GPR data, inspiration from DTS
3. *Joint publications, present synthesis* at summer school month 18
4. No changes for the indicated *deliverables*

Same opinion about the just administrative organization in WPs. (EU organization/working groups)

Jan Fleckenstein: the meetings could also be used for sharing scientific news.

X: need of a committee to assess the data storage standards/the metadata?

WP3/ Niklas Linde

Interest for a hydrogeophysical review about mobile, and a review out of the WP limits.

Important before the PhD starts, in September, to think more about secondments/ mobility of the students.

Need to clarify what are the sites essential for each ESR => should be figured during the summer and maybe less sites for some ESR.

Olaf A. Cirpka: Too many offers (not realistic) => should discuss with applicants, and see what is realistic and can be done. Maybe just do some stuffs, not all but do it entirely.

Niklas Linde: in *Assemble*, very good students, the exchanges between partners were useful. It is important to collaborate (efficiently). Question of quality/quantative

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WP4: Olaf A. Cirpka

Targets of property fields

Deliverables:

1. Open sources codes with benchmarks (algorithms)
2. Report comparing different inversion strategies (should concern other WP)

Discussion about structure/image constraining between Jesus Carrera/Olaf A.Cirpka/SKB.

T.Le Borgne : for the next meetings : keep separate small meetings or common meetings ?

Olaf A. Cirpka : **not sure about splitting in the 4 WP, should be done differently.**

WP5 Training

Presentation by F.Nguyen

? Mid term training progress reports by supervision committee : maybe invite some EU => according to Lydia Brunault, there will be a sort of mid term evaluation : with scientific and administrative reports.

Olaf A. Cirpka: too many WS/activities ? when will work the trainees ? => everyone agree but something could be merged.

P.Davy : a solution = 2 meetings per year and the meetings would be coupled with the WS

- ⇨ F. Nguyen suggests to discuss it within the TTC to be efficient. The WS will be reshuffled by the committee
- ⇨ Lydia Brunault: What is mandatory and what is not : only the ESR are mandatory (the contracts) + the deliverables, for the rest (the training), you just explain everything.

The WS(workshops) could be opened to other PhD not only the ESR, in the limit possibilities. Maybe they have to pay something if there are not from our teams.

Fee estimation for the Summer School : 900€/2weeks (fee without travel, for lunch & accommodation) last time.

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Tuesday 31/01/2017

Management, administrative & financial issues – Lydia Brunault, DR17

Several boards :

- Advisory board

- Supervisory board :

Chairman = P. Davy + 1 representative of each beneficiary + 2 ESRs (girl & boy).
Main role = decision-making body of the Consortium.

Sub committees under the Supervisory Board :

- The Selection Committee = 7 persons from the SB.
- Training & Tutoring Committee = 8 persons from SB.
- Experimental Infractructure Committee = 6 persons from the SB & 3 experts from the advisory board

1. **Contractual management:**

1. Core Grant Agreement n° 722028 (part I & part II)
2. Consortium Agreement

2. **EC payment schedule:**

11 beneficiaries & 10 partner organizations. Costs will be reimbursed after the 2 reporting periods.

Field & research is in the institutional costs and it is allowed to use Management & overheads. Members should keep all the records about the ESR (salary slips, contracts).

Question cparté de Caroline Darcel : coûts présence KOM, et meetings => réponse de L.Brunault ; à prendre sur les Management& overheads ou Recherche RTN si plus dispo à la fin.

3. **Recruitment rules:**

30 days to send the applicant file to EC

Reporting process: 2 periods.

M24 & M48 (there are 60 days to send the reports). The coordinator will submit online through the Participant Portal.

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

[…]

Selection Committee

created in November 2016. 3 deadlines for the Recruitment : 23/01 & 25/03, 25/06/2017.

Advertisement started on Christmas 2016 and early January 2017.

Each ESR Supervisor establishes his own list of applicants, the SC will give advice and help.

The selected candidates will be interviewed by the main ESR supervisors. Selected candidates will have their travels funded to meet the supervisor (paid by the prioritized supervisor => to cover the costs question for LYDIA ? => institutions choice

The final decision will be made by the selection committee. The aim is that selected ESR all start within six-month period so that they can form a group that will attend all the training event. (June 2017 +/- months, max May – September/October)

Some Stats:

Few applicants for ESR3 (Unine), ESR10(Jülich), ESR11(Liège), ESR12(Jülich). Lot for ESR1, ESR4.

Earthworks : continue for more 30 days with update about the deadlines. *(done 03/02/2017)*

For applicants who have already applied in the first deadline, they are being reviewed.

Letter of rejection centralized by the SC? Important to inform the rejected ones.

The Supervisors send a list of not interesting candidates and P.Davy/N.Linde/M-F.Gerard will send a rejection Email.

Add a column: each ESR responsible Highlight A/B/C candidates for ENIGMA (not only for specific ESR) + I will interview this person (Skype/personally) during this week
=> *done 03/02/2017*

Evaluation A/B/C for ENIGMA => supervisor could review this column to search candidates.

SLIDE "MOVING FORWARD":

- ⇨ Skype interviews

Olaf A. Cirpka: mobility in Europe, favors Europeans or people in Europe.

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Jesus Carrera : not only European.

Double interviews : need for a "gentleman agreement ?"
There cannot be any shallow/doubts in this process for Jesus.
Transparency

Several : How do we handle the situation of Mithra for instance ?
N.Linde : Applications only through the website with preferences.
S.Huisman : supervisors of each preferred positions should have the possibility to interview candidates.

TL.Borgne: if there are 3 choices => there can be 3 interviews either Skype or presence.

Offers should be send together.

Logic now :

Indicate Gmail address (all KOM participant) to see the Google files

Process for the Applicants Review (discussed after the meeting with Niklas Linde – President of SC)

- for Friday : The ESR responsible in the SC committee mark for each applicant with the corresponding ESR as the highest priority (i) A/B/C rank in terms of potential for Enigma as a whole & (ii) the gender of the candidates
- For next Wednesday : For candidates that you want to interview, please indicate (yes) at the column corresponding to your ESR and the line corresponding to the candidate you want to interview provided that your ESR is indicated as one of the three preferred positions.
- Physical or Skype interviews should normally be conducted before the end of February
- Offers should be coordinated if multiple institutes interview a given candidate and multiple offers from different institutes should be given at the same time. When giving offers, it is very important to inform the cancidate that the SC makes the final decision.

  <u>B/C. candidates</u>:

  For the people left, they should receive a standard letter.

  Candidates A non kept after interviews : we will see.

  For good candidates : take them.

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All A female candidates should be interviewed. Pool of A candidates/recruitment.

- ⇨ Would be nice to indicate Sir/Mrs on the recruitment form (done 03/02/2017)

This is a guide for others to review this application.

You can offer position but the offer will be made by the Selection Committee or simultaneously.

When an offer has been made and accepted, the SC confirms (email: for the ESR supervisors: please answer/confirm within 2 days) and the ESR will be retrieved from the recruitment Form.

There will be a new google document for the second application.

Start date for the PhD: is flexible between May to September within the first year of the project (2017).

Selection Committee: role after recruitment?

Website: add the mention for the applicants: just be about to finish the master if not already finished (=>done 03/02/2017)

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Constitution of committees

Supervisory Board : All infrastructure supervisors & a representative of each of the partners, to validate all the decisions, solve conflicts..

1. CNRS Rennes	Philippe Davy
2. CSIC Barcelona	Jesus Carrera
3. Forschungszentrum Jülich, Agrosphere Institute IBG-3	Sander Huisman
4. Helmholtz Centre for Environmental Research	Jan Fleckenstein
5. University of Liège	Frédéric Nguyen
6. University of Tübingen	Olaf A.Cirpka
7. University of Copenhagen	Majken Looms Zibar
8. University of Lausanne	Niklas Linde
9. Neuchâtel University	Philipp Brunner
10. µQuans	Bruno Desruelle
11. Itasca Consultants S.A.S.	Caroline Darcel
12. SILIXA (partner not beneficiary)	Athena Chalari
Stanford University	Jef Caers
Oregon University	John Selker
University of Montpellier	Cédric Champollion
BRGM	J-Christophe Maréchal
SKB	Jan-Olof Selroos
AQUA	Tanguy Robert
University of Mons	Pascal Goderniaux
ACA	Mireia Iglesias Carrera

Training & tutoring Committee & Experimental Infrastructure & Selection Committee :

Training & tutoring	**Experimental Infrastructure**	**Selection Committee**
Frédéric Nguyen (ULG)	Laurent Longuevergne (Ploemeur)	Philippe Davy
Jan Fleckenstein (UFZ)	Jan Vanderborght (Krauthausen)	Olivier Bour
Majken Looms(UCPH)	Alain Dassargues (Hermalle)	Damien Jougnot
Caroline Darcel(ITASCA)	Carsten Leven (Lauswiesen)	Jesus Carrera
Olaf Cirpka (UT)	J-Christophe Maréchal (Hyderabad)	J.A (Sander) Huisman
Philip Brunner (UNINE)	Mats Ohlsson (SKB)	Jan Fleckenstein
Maria Pool(CSIC)	Nico Trauth (UFZ -Selke)	Frederic Nguyen
Damien Jougnot (CNRS)	Karsten Jensen (Hobe)	Carsten Leven-Pfister
Jan van der Kruk (FZJ)	Philippe Brunner (Emme)	Majken C. Looms
	Maria Pool (Argentona)	Niklas Linde
	Cédric Champollion (Larzac)	Philip Brunner
	Kostantinos Chalikakis (LSBB)	Cédric Champollion
	& 3 experts from the advisory board	Bruno Desruelle
	Beth Parker	Caroline Darcel
	Kamini Singha	Athena Chalari
	Ty Ferré	

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Database :

1. Tereno : local databases communicating with one common portal

Some data go directly from sensors to servers.

Teodoor : www.tereno.net = tereno data portal

Files can be uploaded in the system. The database is more for the sensors data/time series data.

For the campaign : they use zip files (tracers)

2. Hobe:

Datamodel : station + attribute => Measurement

Dataflow : Collection -> transfer -> quality assurance -> validation. The data are validated by HOBE, inserted in the database by an external company.

Hobe is working to share their data also through the Tereno webportal.

Jesus Carrera: the quasi standard ? See the American access to the data.
Synthetic/numerical benchmark / database ? : create a virtual sit in the database

The codes should be avalaible with SVL or webservices/ WPS.

The database should still be available after the project => link it to TERNO/HOBE/H+

3. H+ Database

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Discussion of the Experimental IC

Discussion of the TTC

New Schedule to be implemented in the DoA (and associated deliverables)

2017 september/October Liege/Ploemeur field oriented with training on database with network meeting in between ULG FZJ CNRS

2018 8–16 february : Lausanne/Neufchatel modeling with break event (TBD) UT CSIC UNINE UNIL

2018 25 june –6 july Summer school Corsica by CNRS

2019 Barcelona lifestime skill and midterm review of the ESR

2019 July Groundwater conference with special session

June 2018 : CWR Saint Malo

2020 final conference Copenhagen (?)

⇨ Needs a global agreement before asking the PO to amend the initial Core Agreement : Lydia will see in early February with Frédéric Nguyen

[Extract from F. Nguyen presentation after the discussion:]

- 2017 september-october Liege/Ploemeur (Advanced subsurface imaging « field oriented » with training on database), with Network meeting in between (exact dates to be fixed between ULG/FZJ and CNRS)
- 2018 7-16 February Lausanne/Neufchatel (Advanced inverse modeling and stochastic representation of complex media, Predictive modelling and upscaling) with break event (TBD) (UT, CSIC, UNINE, UNIL)
- 2018 25 June- 6 July Summer school Corsica (Sensing and modelling of flow and transport processes) by CNRS
- 2019 Barcelona lifestime skill and midterm review of the ESR
- 2019 July Groundwater Quality with special session
- 2020 Final conference Copenhagen (?)

Costs of local organization taken by coordinator

This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Costs : Research costs kept by the Coordinator for the organization of these events.
The travels/accommodation : Research costs of each beneficiary.

Secondments costs: accommodation in the other countries with their own funding supports (their mobility allowance/salary).
=> need for a common agreement : need a clear message from P.Davy/TLeBorgne/M-F.Gerard :

for the other ITNs : beneficiaries paid transportations, visas, congress fees… and ESRs paid the accommodations

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Enigma ITN

Summary report

Minute of Progress Meeting – Deliverable D7.9

ENIGMA meeting at the EGU (European Geosciences Union)

ENIGMA/GA 722028

Vienna & Skype 04/26/2017

Summary

Participants 2
Wednesday 04/26/2017 3
Recruitment: 3
Workshops 3
Cargèse 4
Things to do / Important notes 4

Participants

CNRS	Damien Jougnot
Silixa	Athena Chalari <Athena.Chalari@silixa.com>,
CNRS Rennes	Tanguy Le Borgne <tanguy.le-borgne@univ-rennes1.fr>,
University of Liège	Frederic Nguyen <f.nguyen@ulg.ac.be>,
CNRS Rennes	Olivier Bour <olivier.bour@univ-rennes1.fr>,
University of Leipzig	Jan Fleckenstein <jan.fleckenstein@ufz.de>,
CNRS	Ludovic Bodet <ludovic.bodet@upmc.fr>,
University of Leipzig	Nico Trauth <nico.trauth@ufz.de>,
CSIC Barcelona	Jesus Carrera <jesus.carrera.ramirez@gmail.com>,
CSIC Barcelona	Maria Pool <mpoolr@gmail.com>
CNRS Rennes	M-Françoise Gerard (Skype from Rennes)

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[In italic: answers provided after the meeting.]

Wednesday 04/26/2017 – 17h-18h15

Recruitment:

ESR1: they have 1 potential candidate from Morocco

ESR3: P. Brunner is interviewing several potential candidates (on May 02 & 03 2017)

ESR4: they interviewed several candidates => *offer sent to J. Molron on 09/05/2017*

ESR5: they are interviewing 3 candidates and may choose one in the next weeks (or wait for the 3rd round) => *if SC committee validates the application, L. Blazevic will receive an offer ~12/05/2017*

ESR6 : 2 potential candidates, interviews planned during May

ESR8 : Interview with Ms Cooke on 28/04/2017 and may be with one another candidate.

ESR10: One candidate found, offer will be sent Sunday 31/04 if SC members are ok.
=> *P. Haruzi accepted the offer.*

ESR14 : several CV good, already 3 interviews, wants to see all candidates. 1 potentially good candidate.

The other ESRs positions are filled.

Worries from Jan Fleckenstein about candidates starting later : need to fill something : proposition : M-Françoise Gerard will send a Researcher Declaration in a more formal way for ESR to fill *(=> done 04/05/2017)*

Change the deadline: end of second week of July

Workshops

Dates

9-12 October: workshop in liège

12-13 October enigma global meeting in Liège , 12 evening: social event Enigma

16-20 in Ploemeur

H+ meeting will probably be coupled with Enigma meeting in Liège (during 12 or 13)

- If workshop are opened to public (mandatory ?=> *no, only Summer school and Final Conference are supposed to welcome other researchers/students*),
- how should it work ?

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M-Françoise Gerard asks F. Nguyen for estimation costs.

What is mandatory for the advisory board ? => *need to meet only once in person else in Skype), & they will be there for Cargèse*

- ⇨ Maybe better invited in Cargèse for giving some talks & not for this workshop

Cargèse

Last week June & first week in July in 2018

Organized by C. Roques/T.Le Borgne/D. Jougnot

25 lecturers (4 lectures/day of 1hour, in 10 days).

For Jesus Carrera, it is important/ better to change and not do the same because it was to crowded last time.

Things to do / Important notes

M-Françoise Gerard will check with Catherine Barbedor if possible if Liège pays and the CNRS coordinator would reimburse Liège

- ⇨ *Not possible !*

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Enigma ITN

ENIGMA *Innovative Training Network:* **European training Network for In situ imaGing of dynaMic processes in heterogeneous subsurfAce environments**

Second Enigma ITN / H+ Meeting

October 12 & 13, 2017 Université de Liège, Salle des Professeurs (Place du XX aout)

Minutes of the Meeting n°2

ENIGMA ITN has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Agenda

Thursday October 12th, 2017

8h30 - 12h: **H+ meeting**

12h -18h30: ENIGMA meeting

Participants: **ENIGMA beneficiaries and associate partners, ESRs, H+ partners**

12h00 – 13h00 ***Lunch***

13h00 – 13h30	General presentation	*Salle des Professeurs*	F. Nguyen introduction P.Davy / T.Le Borgne
13h30 – 15h00	Presentation of each PhD student (ESR): 6 slides for 6': self-introduction, master thesis & presentation of research topic and secondments	*Salle des Professeurs*	Chairman : F.Nguyen & P.Davy
15h00 – 16h00	General discussion	*Salle des Professeurs*	Chairman : F.Nguyen & P.Davy

Coffee break

16h30 – 18h00	Presentation of the ENIGMA experimental sites (14 sites, 10' per site)	*Salle des Professeurs*	Experimental site scientific managers (including H+)
18h00 – 18h30	Presentation of the database creation for the Hermalle site in H+ database	*Salle des Professeurs*	T. Hermans, A. Battais, M-F.Gerard, J. Lopez Alvis, R.Hoffman,

19h30 ***Social Event at brasserie C : Impasse des Ursulines, B-4000 Liège***

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Presentation of each PhD student (ESR): 6 slides for 6': self-introduction, master thesis & presentation of research topic and secondments

- *ESR1: not present, J.Carrera presents the future PhD Kevin de Vriedt and the planned works at CSIC*
- ESR2: Guilherme Nogueira, Brazilian, University of Leipzig
- ESR3: Álvaro Pardo Álvarez, Spanish, University of Neufchatel
- ESR4: Justine Molron, Belgian, Itasca & CNRS Rennes
- ESR5: Lara Blazevic, Venezuelan Croatian, CNRS Rennes
- *ESR6: Behzad Pouladi, Iranian, not present, (he is waiting for his visa). He may join us for the next workshop in Ploemeur. Introduction by O.Bour, CNRS Rennes*
- ESR7: Joel Tirado Conde, Spanish, University of Copenhagen.
- ESR8: Anne-Karin Cooke, German, µQuans and University of Montpellier
- ESR9: Alejandro Fernandez Visentini, Argentina, University of Lausanne
- ESR10: Peleg Haruzi, Israeli, University of Jülich
- ESR11: Richard Hoffmann, German, University of Liège
- ESR12: Satoshi Izumoto, Japanese, University of Jülich
- ESR13: Veronika Rieckh, Austrian, University of Tübingen,
- ESR14: Andrea Palacios, Venezuelan, CSIC Barcelona
- ESR15: Jorge Lopez Alvis, Mexican, University of Liège

Enigma structure / spirit –Introduction of experimental sites by Tanguy Le Borgne

- Tanguy Le Borgne : Enigma sites & global introduction
- J. Van der Kruk : Krauthausen site
- Pierre Jamin: Hermalle sous Argenteau
- Carsten Leven: Lauswiesen
- H+ sites by O.Bour : Poitiers, Guidel, Hyderabad ,Aspo site (P. Davy),
- N. Trauth: Tereno (Selke)
- Joel Tirado Conde : Hobe
- Alvaro Pardo Alvarez : Emme
- J. Carrera : Argentona
- C. Champollion : Larzac + LSBB

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Friday October 13th, 2017

Participants:

- **ENIGMA beneficiaries and associate partners, ESRs, H+ partners,**

08h30 – 09h00	Conclusions of the Selection Committee (numbers, good practice…)	*Salle des Professeurs*	N. Linde
09h00 – 09h30	Practical & financial aspects of Enigma ITN	*Salle des Professeurs*	M-F.Gerard

Coffee break

10h30 -11h30	- Training & tutoring Committee (PCDP explanations & tutors for the ESRs) - Formation of PhD Committee for each ESR	*Salle des Professeurs*	F. Nguyen & P. Davy
11h30 – 12h00	2 separate meetings for : - The Supervisory Board - The Experimental infrastructure Board	*2 Rooms*	Chairman : P.Davy & a representative for L. Longuevergne
12h00 – 12h30	Presentation of upcoming - workshops - summer school	*Salle des Professeurs*	O. Bour, N.Linde D. Jougnot
12h30 – 13h	Discussions between ENIGMA teams and all participants about the secondments of the ESRs	*Salle des Professeurs*	

Lunch

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Conclusions of the Selection Committee (numbers, good practice…)

Presentation by Niklas Linde

Practical & financial aspects of Enigma ITN

M-F.Gerard & T.L.Borgne, F.Nguyen

Questions from S.Huisman & N.Linde: what is expected for WP leaders regarding deliverables & periodic reports? What extent & their roles ? The coordination team will examine these questions and will send emails for explanations, according to the Grant Agreement.

Training & tutoring Committee (PCDP explanations & tutors for the ESRs) – F.Nguyen

Tutor appointed for the ESRs: Damien Jougnot, CNRS Metis.

D.Jougnot: indicates what Europe suggests about dissemination/communication through social media:

- ResearchGate: posters and presentations published on ResearchGate. Possibility to create the Project Enigma on ResearchGate. It is not mandatory but could be a good idea to increase the visibility. ESRs could create a profile and form a network.
- LinkedIn: more professional network. ITN has connections with the industry and private sector. Creation of a public group, everybody adds his own data & it keeps tracks of everybody. The idea is to benefit from the network for the future whatever the ESRs will be.
- Twitter could also be used by ESRs to promote an account for Enigma. This could be thought for the next meeting.
- Videos are promoted by EU for ITNS & society: what would be the impact on society for ITNs. The ESRs should keep in mind that we are asked to promote and communicate about the project. It could be nice to see the work in progress explained in short videos by the ESRs, maybe in one year.

- To promote you: think about a short description/picture/description about the project.
  Joel Tirado Conde: better to have a template for the ESRs but P.Davy highlights: feel free to be out of template. N.Linde suggests to find a balance between serious and fun & self-presentation.

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F.Nguyen & About workshops with N.Linde:
Slides from N.Linde:
" WS3 (3 days) & 4 (4 days) in Lausanne and general two-day meeting in February 2018:

- Workshop III: *Predictive modeling and upscaling of flow and reactive transport in heterogeneous aquifers* (3 days)
- Workshop IV: *Advanced inverse modeling and stochastic representations of heterogeneous porous and fractured media* (4 days)
- Coordinators of workshop III: **Carrera, Dentz and Cirpka**
- Coordinators of workshop IV: **Linde and Renard**

Exact dates:

- 5 (Monday) February: ESRs travel to Lausanne
- 6 (Tuesday) – 8 (Thursday) February (Workshop III);
- **9 (Friday) – 10 (Saturday) February (Enigma General meeting);**
- 11 (Sunday) February (Free day : skiing or other snow activities for those interested)
- 12 (Monday) – 15 (Thursday) February (Workshop IV)
- 16 (Friday) ESRs travel from Lausanne "

Question from Niklas Linde: is it acceptable to have a meeting Friday & Saturday?
N.Linde warns about the issues for the softwares and will see with the other supervisors for the workshops.
=> N.Linde, Jesus Carrera, Marco Dentz and Olaf A.Cirpka discussed by email afterwards. All supervisors accepted to organize this event in Lausanne in February.
Lausanne is expensive but ESRs have good grants and the ESRs could share a rented apartment or look for hostels.
N.Linde will send links and prepare about this. Normally everyone should check their visas and European visas to be sure they can go to Switzerland. Social events could be downhill skiing session on Sunday or a common lunch. At least, half the ESRs would like to try downhill skiing during their free day (of course, ski rental would come from the ESRs pockets).

About Summer school - D.Jougnot
June 25th – 6 July 2018 (leave on July 7th)
Max capacity of 105 people (60 PhD)
This time, the ESRs are expected to actively contribute and animate the discussions. They will be contacted for that.
N.Linde: be sure that the lectures will not be boring for the ESRs (as they already will have workshops on some subjects).
ESRs could propose experimental tests.
Among supervisors: J.Van der Kruk will come, F. Nguyen and A. Dassargues the 2nd week, Sander Huisman is not sure he will be able to come.

A general meeting in Cargèse should be planned. **The advisory board will be there, and most of the people will be there during the 2nd week**

About WSII: O.Bour, slides to shortly overview the second workshop

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F.Nguyen
Information about PCDP
F.Nguyen will re send the template for the PCDP to the supervisors.
Tasks ahead: appointment of a fellow tutor;
D.Jougnot, secondments: questions for ESRs.
For the next workshops: the industrial partners would be invited so that the ESRs can meet them and discuss with them. They would make a presentation during next meeting.
For the secondments, what are the minimum of time with the industrial partners?
This will be checked with the EU by the coordination team.

The Experimental infrastructure Board

T.L.Borgne introduction
Question of Jesus Carrera about policy: how to prevent an external use of the data before publication with the H+ database.
Tanguy Le Borgne: the data of other people are not used by other people before publication.

Presentation about Hermalle / H+ database by J.Lopez Alvis and R.Hoffmann
Geophysical: it would be raw data and inversion results
Tanguy Le Borgne: do you already have some ideas about data storage?
Jan van der Kruk: the data will be stored in Tereno, there would be a link
For Carsten Leven: For the Tübingen part, they will use Campos
Tanguy Le Borgne: it could be good to have a common format: M-Françoise Gerard & Annick Battais will coordinate this with the database managers of the different sites.
Jan van der Kruk: Metadata are most important

Tanguy Le Borgne: for the next meeting: the ESRs will be asked what are the strategies about data storage and what they think about it.
All the sites presentation will be uploaded on the website. (It would be nice to have information about contact people)

The Supervisory Board

P.Davy presentation:

- Validation of Supervisory Board: the definitive list is presented and accepted. There will just be a check to do for the final representative for Copenhagen.

- Workshops: precision about Corsica: there would be a mid-term meeting during Sundays, or lunches, or at least a general Enigma meeting.

Programs will be sent (preliminary programs for the Cargèse school) when Tanguy le Borgne, Damien Jougnot and Clément Roques have a final programme.
There will be doodles to determine the best date to have the meeting of the Supervisory Board sent by Damien Jougnot.
The only free day is the Sunday in the middle…

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Possible dates will be sent as soon as possible to fix dates for the Barcelona Workshop in 2019.

OR regarding the Summer School:
They could be just Enigma general meetings not Mid-term meeting (this would be in Barcelona), ESR could have during the 2 weeks a parallel session for one day.

OR the mid-term meeting during Corsica, or move the due date to have it after Barcelona in Spring: there would be a full day of Enigma meeting in Corsica.

Remark from Philippe Davy about ESR program:
4 scientific deliverable reports could be review papers. The supervisory board is supposed to look if everything is going fine.

Election of ESRs representatives: the representatives for the ESR in the Supervisory Board are:

- ⇨ Alejandro Fernandez Visentini and Veronika Rieckh

Discussions about secondments

N.Linde: Precision for secondments: money from the beneficiary to be used for when his/her ESR leaves for a secondment. To keep in mind, your own supervisor to see for questions of travels and accommodation.
F.Nguyen: This could be clarified also by emails.

Then the participants discuss in smaller groups about the secondments objectives, ideas, plans…

13h30: End of the Enigma meeting n°2. Liège, 12 & 13 October 2017

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End of Annex 3

Annex 4

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MARIE SKLODOWSKA-CURIE ACTIONS
ENIGMA Innovative Training Networks -2017

ITN Enigma

ENIGMA Innovative Training Network: 15 PhD positions

European training Network for in situ imaGing of dynaMic processes in heterogeneous subsurfAce environments

ENIGMA is an Innovative Training Network (ITN) funded by the European Commission. The ENIGMA ITN aims at training a new generation of young researchers **in the development of innovative methods for imaging process dynamics in subsurface hydrosystems,** in order to enhance understanding and predictive modelling capacities and to transfer these innovations to the economic sector.

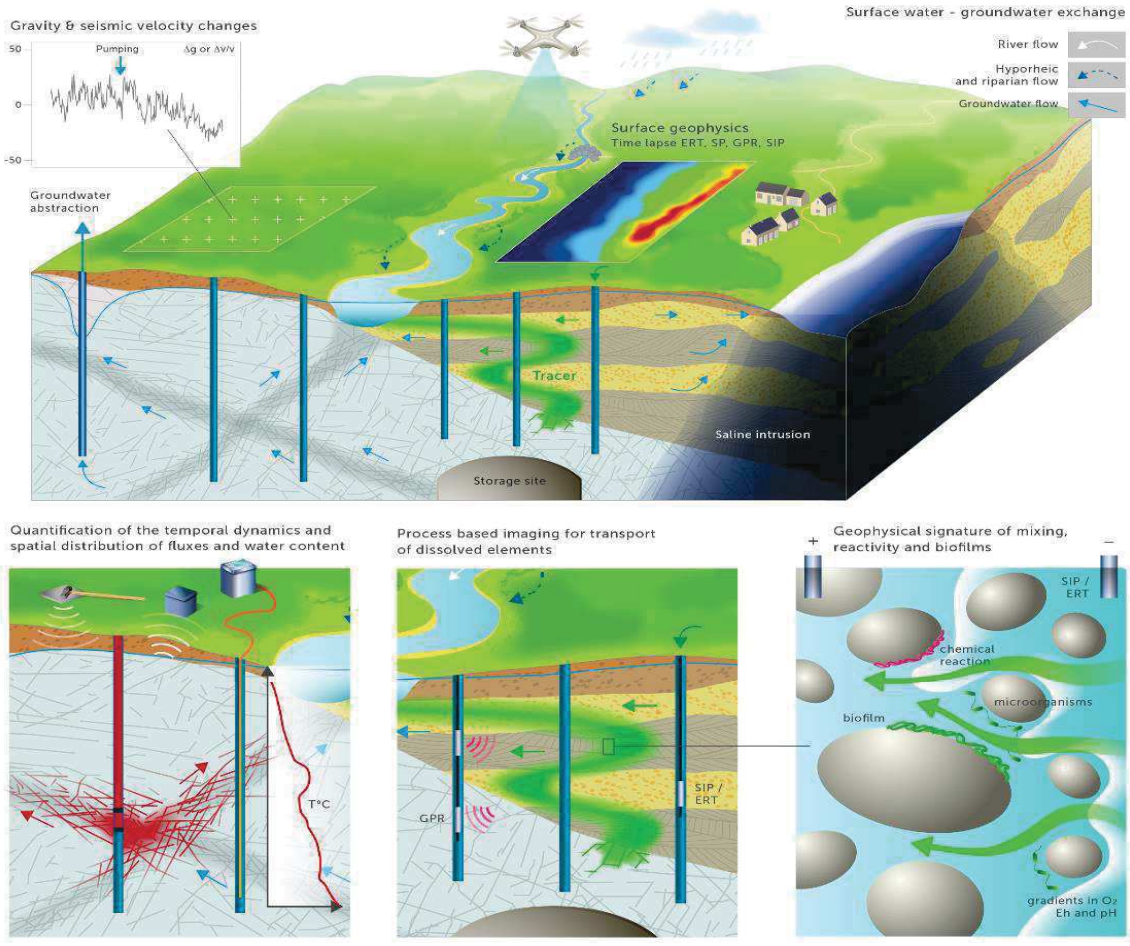
The 15 young future PhD students will contribute to develop the spatial representation of subsurface heterogeneity, fluxes, chemical reactions and microbial activity, through the **integration of data** and approaches from **geophysics, hydrology, soil physics, and biochemistry**.

The ENIGMA network gathers 21 partners (14 academic and 7 industrial) from 8 European countries.

Each of the **15** future PhD students will conduct the research work in 2 or 3 institutions, in collaboration with industrial partners. ENIGMA will start in January 2017.

Website: https://enigma-itn.eu/

We are now recruiting students with a Master degree for three-year PhD positions (starting before July 2017). Applicants should apply through the website with a motivation letter for up to 3 PhD topics from the list below (see website for further details), a CV with relevant documentation, and names of at least two referees.



PhD POSITIONS AVAILABLE:

ESR1-PhD: **Mixing and chemical reaction hotspots in saline-freshwater mixing zones**
Supervisor: Marco Dentz, Jesus Carrera, **CSIC Barcelona** (CNRS Rennes, UNIL Lausanne, ACA Barcelona)[1]

ESR2-PhD: **Imaging flow dynamics and reactivity in the stream-aquifer transition zone**
Supervisor: Jan Fleckenstein, **UFZ Leipzig** (UCPH Copenhagen, UNINE Neuchâtel)[1]

ESR3-PhD: **Closing the observational gap between the hyporheic and meander scale**
Supervisor: Philip Brunner, **UNINE Neuchâtel** (UFZ Leipzig, GEOTH Heiligenstadt)[1]

ESR4-PhD: **Flow and transport in fracture networks: reducing uncertainty of DFN models by conditioning to geology and geophysical data**
Supervisor: Caroline Darcel, **ITASCA,** Philippe Davy, **CNRS Rennes,** (UNIL Lausanne, SKB Sweden)[1]

ESR5-PhD: **Monitoring spatio-temporal water redistribution in the subsurface with seismic methods**
Supervisor: Laurent Longuevergne, **CNRS Rennes,** Ludovic Bodet, **UPMC Paris** (UNIL Lausanne, SKB Sweden)[1]

ESR6-PhD: **Active Fiber-Optic DTS methods to monitor subsurface flow dynamics**
Supervisor: Olivier Bour, **CNRS Rennes** (CSIC Barcelona, OSU Oregon, SILIXA)[1]

ESR7-PhD: **Multi-scale thermal imaging of groundwater upwelling in stream valleys**
Supervisor: Peter Engesgaard, **UCPH Copenhagen** (UNINE Neuchâtel, UFZ Leipzig)[1]

ESR8-PhD: **Monitoring water storage changes with a new portable absolute quantum gravimeter**
Supervisor: Bruno Desruelle, **µQuanS,** Cédric Champollion**, UM Montpellier** (UCPH Copenhagen)[1]

ESR9-PhD: **Geophysical signatures of spreading and mixing**
Supervisor: Niklas Linde, **UNIL Lausanne** (CNRS Rennes, CSIC Barcelona)[1]

ESR10-PhD: **High resolution imaging of transport processes with GPR full-waveform inversion**
Supervisor: Jan van der Kruk, **FZ Jülich** (CNRS Rennes, UNIL Lausanne)[1]

ESR11-PhD: **Joint heat and solute tracer test inversion for imaging preferential pathways**
Supervisor: Alain Dassargues, **ULG Liège** (BRGM Orléans, FZ Jülich)[1]

ESR12-PhD: **Spectral induced polarization monitoring to quantify biochemical reactions**
Supervisor: Sander Huisman, **FZ Jülich** (CNRS Rennes)[1]

ESR13-PhD: **Fully coupled hydrogeophysical inversion of 3D tracer tomography**
Supervisor: Olaf A. Cirpka, **UT Tübingen** (ULG Liège)[1]

ESR14-PhD: **Geologically constrained joint inversion of hydraulic, tracer and ERT data for process visualization**
Supervisor: Jesus Carrera, **CSIC Barcelona** (UCPH Copenhagen, ACA Barcelona)[1]

ESR15-PhD: **Integration of dynamical hydrogeophysical data in a multiple-point geostatistical framework.**
Supervisor: Frédéric Nguyen, **ULG Liège** (CSIC Barcelona, AQUA Montpellier)[1]

[1] Candidates will devote time to learn methods and/or do field work at co-supervising centers, in parenthesis.

MARIE SKLODOWSKA-CURIE ACTIONS
ENIGMA Innovative Training Networks -2017

ITN Enigma

ENIGMA *Innovative Training Network: 08 PhD positions*

European training Network for in situ imaGing of dynaMic processes in heterogeneous subsurfAce environments

ENIGMA is an Innovative Training Network (ITN) funded by the European Commission. The ENIGMA ITN aims at training a new generation of young researchers **in the development of innovative methods for imaging process dynamics in subsurface hydrosystems,** in order to enhance understanding and predictive modelling capacities and to transfer these innovations to the economic sector.

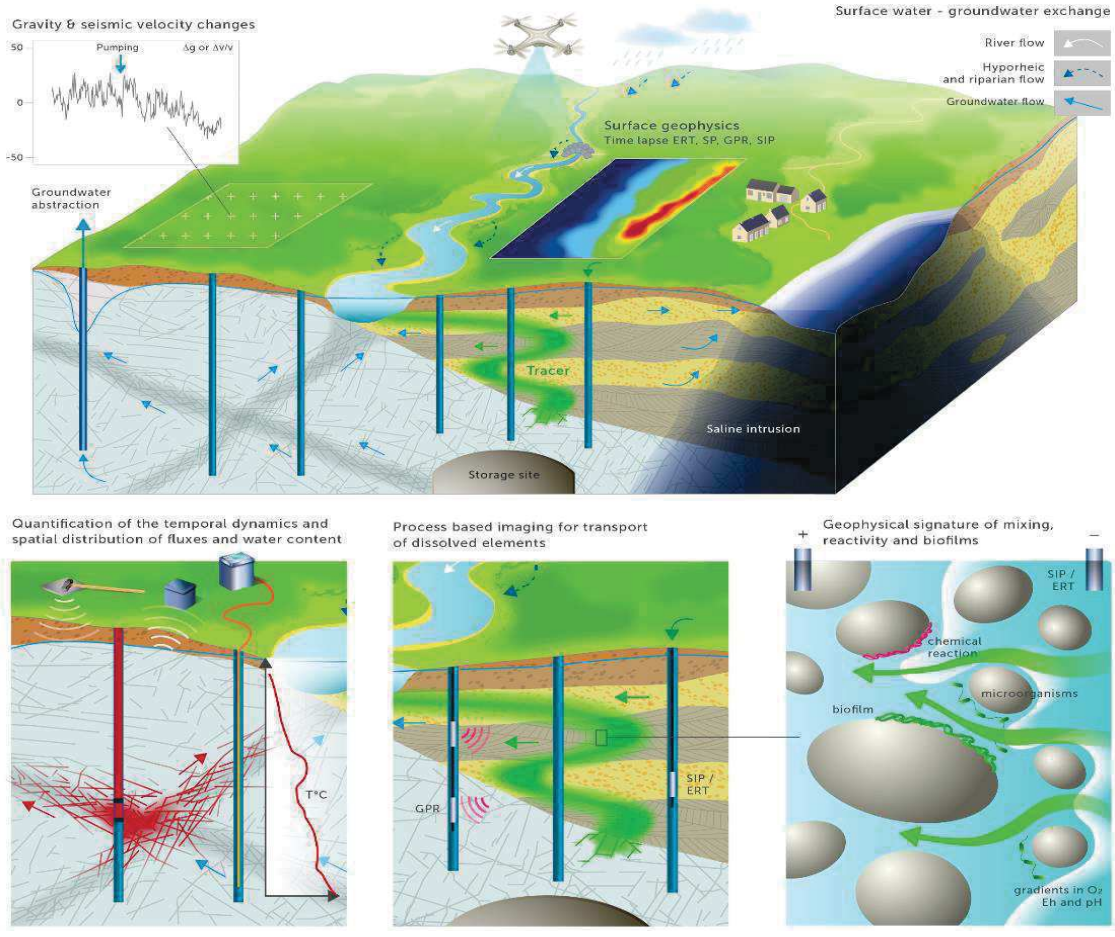
The 15 young future PhD students will contribute to develop the spatial representation of subsurface heterogeneity, fluxes, chemical reactions and microbial activity, through the **integration of data** and approaches from **geophysics, hydrology, soil physics, and biochemistry**.

The ENIGMA network gathers 21 partners (15 academic and 6 industrial) from 8 European countries.

Each of the **15** future PhD students will conduct the research work in 2 or 3 institutions, in collaboration with industrial partners. ENIGMA started in January 2017.

Website: https://enigma-itn.eu/

We are now recruiting students with a Master degree for three-year PhD positions (starting preferably before July 2017). Applicants should apply through the website with a motivation letter for up to 3 PhD topics from the list below (see website for further details), a CV with relevant documentation, and names of at least two referees.



PhD POSITIONS:

ESR01-PhD: **Mixing and chemical reaction hotspots in saline-freshwater mixing zones**
Supervisor: Marco Dentz, Jesus Carrera, **CSIC Barcelona** (CNRS Rennes, UNIL Lausanne, ACA Barcelona)[1]

ESR02-PhD: **Imaging flow dynamics and reactivity in the stream-aquifer transition zone**
Position filled

ESR03-PhD: **Closing the observational gap between the hyporheic and meander scale**
Supervisor: Philip Brunner, **UNINE Neuchâtel** (UFZ Leipzig, GEOTH Heiligenstadt)[1]

ESR04-PhD: **Flow and transport in fracture networks: reducing uncertainty of DFN models by conditioning to geology and geophysical data**
Supervisor: Caroline Darcel, **ITASCA,** Philippe Davy, **CNRS Rennes,** (UNIL Lausanne, SKB Sweden)[1]

ESR05-PhD: **Monitoring spatio-temporal water redistribution in the subsurface with seismic methods**
Supervisor: Laurent Longuevergne, **CNRS Rennes,** Ludovic Bodet, **UPMC Paris** (UNIL Lausanne, SKB Sweden)[1]

ESR06-PhD: **Active Fiber-Optic DTS methods to monitor subsurface flow dynamics**
Supervisor: Olivier Bour, **CNRS Rennes** (CSIC Barcelona, OSU Oregon, SILIXA)[1]

ESR07-PhD: **Multi-scale thermal imaging of groundwater upwelling in stream valleys**
Position filled

ESR08-PhD: **Monitoring water storage changes with a new portable absolute quantum gravimeter**
Supervisor: Bruno Desruelle, **µQuanS,** Cédric Champollion**, UM Montpellier** (UCPH Copenhagen)[1]

ESR09-PhD: **Geophysical signatures of spreading and mixing**
Position filled

ESR10-PhD: **High resolution imaging of transport processes with GPR full-waveform inversion**
Supervisor: Jan van der Kruk, **FZ Jülich** (CNRS Rennes, UNIL Lausanne)[1]

ESR11-PhD: **Joint heat and solute tracer test inversion for imaging preferential pathways**
Position filled

ESR12-PhD: **Spectral induced polarization monitoring to quantify biochemical reactions**
Position filled

ESR13-PhD: **Fully coupled hydrogeophysical inversion of 3D tracer tomography**
Position filled

ESR14-PhD: **Geologically constrained joint inversion of hydraulic, tracer and ERT data for process visualization**
Supervisor: Jesus Carrera, **CSIC Barcelona** (UCPH Copenhagen, ACA Barcelona)[1]

ESR15-PhD: **Integration of dynamical hydrogeophysical data in a multiple-point geostatistical framework**
Position filled

[1] Candidates will devote time to learn methods and/or do field work at co-supervising centers, in parenthesis.

The ENIGMA ITN has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028

4th Cargèse Summer School on *Flow and Transport in Porous and Fractured Media, Development, Protection, Management and Sequestration of Subsurface Fluids*

Summer School

June 25th to July 7th 2018

Corsica, France

Website: https://cargese2018.sciencesconf.org/

Registration will open on January 15, 2018

Organized in the framework of

***ENIGMA** Innovative Training Network*

European training Network for in situ imaGing of dynaMic processes in heterogeneous subsurfAce environments

End of Annex 4

End of deliverable D7.7 – D31

Progress report – Enigma ITN

January 2018

ENIGMA ITN - This project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement N°722028.

Enigma ITN

End of deliverable D7.7 – D31